STATE OF MISSOURI

Bob Holden, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

RECEIVED

APR 19 2001

April 16, 2001

Mr. John Smith
Chief, RCAP Branch
U.S. EPA Region VII
901 N. 5th St.
Kansas City, KS 66101

Dear Mr. Smith:

The Comprehensive Groundwater Monitoring Evaluation (CME) Report for the Solutia-Queeny facility in St. Louis, Missouri, has been completed. A final copy is being transmitted with this letter. This report fulfills the commitment for completion and submission.

If you have any questions, please call me at (573) 751-3553.

Sincerely,

HAZARDOUS WASTE PROGRAM

R. Bruce Stuart, P.E., R.G.
Chief, Groundwater Unit
Permits Section

RBS:rmb

Enclosure

c: Mr. William A. Spratlin, U.S. EPA Region VII

COMPREHENSIVE GROUNDWATER MONITORING EVALUATION
SOLUTIA – QUEENY FACILITY
SAINT LOUIS, MISSOURI

Conducted by

MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

ROB MURPHY, P.E.

APRIL 2001

COMPREHENSIVE GROUNDWATER MONITORING EVALUATION
SOLUTIA – QUEENY FACILITY
SAINT LOUIS, MISSOURI

Conducted by

MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

ROB MURPHY, P.E.

APRIL 2001

COMPREHENSIVE GROUNDWATER MONITORING EVALUATION
SOLUTIA – QUEENY FACILITY
SAINT LOUIS, MISSOURI

Conducted by

MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

ROB MURPHY, P.E.

APRIL 2001

TABLE OF CONTENTS

APPENDICES

Appendix A – Site Maps

Appendix B – Site Geologic Maps

Appendix C – Potentiometric Maps

Appendix D - Hydraulic Conductivity Test Results

Appendix E – Well Completion/Location Data

Appendix F – Contaminant Extent Figures

Appendix G – SAP Work Sheet

Appendix H - ESP Sampling Audit

Appendix I – DGLS Well Integrity Inspection

Appendix J – Split-Sampling Results

Appendix K – Groundwater Monitoring Results

1. INTRODUCTION

The State of Missouri's Resource Conservation and Recovery Act (RCRA) program authorization is in part contingent on the performance of Comprehensive Groundwater Monitoring Evaluations (CMEs) at facilities that have historically managed hazardous wastes at their Solid Waste Management Units (SWMUs) and/or regulated treatment/storage/disposal units. The RCRA Implementation Plan (RIP) contains provisions which require this type of evaluation at least once every three years for those hazardous waste facilities which have implemented a groundwater monitoring program to detect and/or assess groundwater contamination resulting from waste management practices. The Hazardous Waste Program's Groundwater Unit of the Missouri Department of Natural Resources (MDNR) is responsible for the preparation of the CME reports.

1.1 Objectives and Scope

The purpose of this CME is to evaluate the technical and regulatory adequacy of the groundwater monitoring program implemented at the Solutia Queeny Plant (formerly Monsanto, Inc.) in St. Louis, Missouri. This is achieved through evaluation of the specific technical components of Solutia's groundwater monitoring program to determine: 1) whether the site-specific geology, hydrology and waste constituents have been adequately characterized and 2) whether the groundwater monitoring system is capable of determining the rate and extent of contaminant movement if contaminant releases have been detected. A literature review and an on-site inspection were utilized in the preparation of this CME. Available literature is discussed briefly in the following section, is referenced throughout the report and is formally documented in the report references. The on-site inspection was performed to: 1) document/evaluate Solutia's field sampling, analysis, and measurement procedures; 2) document/evaluate the structural integrity of Solutia's monitoring wells; and 3) split groundwater samples for comparative analysis.

1.2 Information Sources

The primary information sources used as the basis for evaluation of Solutia's groundwater monitoring program include:

- Field inspection documentation and groundwater split sampling results, as provided by the MDNR's Division of Geology and Land Survey (DGLS) and Environmental Services Program (ESP).
- Information contained in the HWP's RCRA TSD files for the Solutia Queeny plant.
- Solutia's RCRA Facility Investigation Data Gap Work Plan (1999).

Additional CME information sources such as local/regional geologic and hydrologic studies, RCRA inspection reports, closure and post-closure plans and EPA guidance documents are detailed in the references section.

2. SITE BACKGROUND

2.1 Facility Description

The Solutia Queeny Plant is located two miles south of downtown St. Louis at 201 Russell Boulevard. The legal description of the facility is the N ½, NE ¼, SE ¼, T.45N., R.7E. and S ½, SE ¼, NE1/4, T.45N., R.7E. in western Cahokia Quadrangle in St. Louis, Missouri.

The Queeny plant occupies approximately 63 acres of industrial land in a floodplain located on the west side of the Mississippi River. The site is bordered by a U.S. Corps of Engineers flood wall and the Union Pacific Railroad tracks to the east. To the north lies the Atlantic Office school bus terminal, a St. Louis Housing Authority office, Benjamin Moore Paint Company, Ethyl Corporation, Rhodia, and Nooter Corporation. A commercial and business district lies to the west of Solutia's property. Illinois/Missouri Supply Company, Loy-Bang Box, Hagar Hinge, and Schaefer Manufacturing lie to the south of the Queeny plant. The entire complex is covered either by concrete, asphalt, or crushed stone.

The manufacturing area comprises 58 acres of the facility, with the easternmost portion located 500-800 feet from the Mississippi River. An additional 5-acre area of the site consists of a bulk chemical storage terminal purchased from Clark Oil and a vacant lot purchased from Hager Hinge on the south end of the facility. No manufacturing or waste management practices have occurred in these two properties. A complete layout of the facility is contained on figures in Appendix A. All Solutia properties are surrounded by an eight feet tall fence with only locked or guarded gates for access.

2.2 Facility Operations

Currently, the Queeny plant uses batch chemical processes to produce, blend, package, and repack organic chemical products. L-aspartic acid is produced in the YY Building as a raw material in the production of aspartime, a sugar substitute in food products. Solutia operates a maleic anhydride briquetting process for Huntsman Corporation. Maleic anhydride is shipped to the plant in railcars, unloaded, and repackaged as briquettes in 50 pound bags. In the PA Building Solutia produces Duralink, a high temperature stabilizer used in rubber tires. In the VV Building Solutia blends and packages a variety of fire resistant fluids, including Skydrol which is used in the airlines industry. The plant currently employs 95 people.

Historically, Monsanto produced the herbicide Lasso in the former portion of the plant known as the Acetanilides Production Area. Since the plant's inception in 1902 with production over a one-acre site, over 200 products have been produced in over 800 different forms, including chemicals, food additives, and drugs. During the 1960s, the plant had expanded to cover 72 acres and employed 1900 full time personnel. By the 1970s, production activities and the number of buildings at the site began to decrease. In 1989, the analgesic business was sold to Rhone Poulenc (now Rhodia) which still operates on the site. In 1990, Solutia halted the production of Lasso in the Acetanilides area. In December 1995, AMJ Investment Inc. bought the northwest portion of the facility consisting of Buildings AAA and BM. More recently, Frito Lay has leased the area known as the Former Bulk Chemical Storage Terminal on the southeast and the Coal Storage Yard in the same vicinity has been sold to Schaeffer Manufacturing. Frito Lay has since ceased operations in this area.

In 1997, Monsanto completed its spin-off of Solutia as a separate entity. Pharmacia has since purchased Monsanto and spun off the "new" Monsanto as a separate Agriculture Division.

2.3 Waste Management Practices

Solutia currently generates approximately 400,000 pounds of hazardous waste a year. Hazardous wastes are stored for less than 90 days in the DDD Warehouse located in the central portion of the facility. From there, the wastes are shipped off-site for treatment and disposal. The wastes are classified primarily as either corrosive or flammable, and consist of:

-distillation column bottoms

-chemical residues

-filter cakes

-filter cartridges

-contaminated floor sweepings

-off-spec products

-used oil

-potentially contaminated personnel protective equipment

-spent solvents

These materials are typically placed in either steel drums or fiberpaks for placement in the DDD Warehouse.

The Queeny plant is currently classified as a large quantity generator of hazardous waste with allowable storage for less than 90 days (ID# 001002). Solutia also has a Wastewater Discharge Permit (NPDES # 4112-0421-00) and a Part 70 Air Operating Permit (OP-96008). Solutia has changed its wastewater stream from a high volume, acidic waste to a low volume, slightly acidic stream. Historically, Solutia had a RCRA Hazardous Waste Management Permit for the storage of hazardous waste in a storage pad area and for the treatment of hazardous waste in an incinerator. Both permitted, RCRA-regulated units were closed in 1994. These units and other Solid Waste Management Units (SWMUs) which have contributed to subsurface contamination at the Queeny facility will be described in the following section of this CME Report.

As part of its ongoing efforts to control and remediate hazardous substances from the facility, Solutia has removed all underground storage tanks from service. Solutia has also removed all PCB sources, implemented a groundwater protection plan, and dismantled all idle facilities. All remaining manufacturing areas and plant streets drain into the facility's wastewater treatment plant. The treatment plant provides elementary neutralization and spill control prior to a permitted discharge to the Metropolitan St. Louis Sewer District system.

2.4 Regulated Units/SWMUs Description

Solutia has identified nine SWMUs in addition to the two RCRA-regulated units at the Queeny plant. Each of these will be described below.

Building FF

The FF Building was a production unit for the manufacture of trichlorocarbanilide (TCC), a bacterierstat used in body soap. Production of TCC occurred here between 1951 and 1991, when building FF was dismantled. The area occupies a space approximately 150 feet by 75 feet and is now a paved parking lot. One of the raw materials used to manufacture TCC was perchloroethylene (PCE), which had been stored in an underground storage tank. The tank reportedly leaked large amounts of solvents into the soils and groundwater in the area. Solutia proceeded with investigation of this SWMU separately and submitted its report "Building FF Investigation" in 1993.

Building WW

Building WW is an existing research and development pilot plant built at the end of World War II. Its dimensions are approximately 75 feet by 105 feet. The SWMU associated with this building is the northeast corner of the structure where an electric transformer was located. The transformer, which had Arochlor (PCB) fluid as a heat transfer medium, was removed in the late 1970's. The area is currently adjacent to a concrete-paved vehicle access road.

Building VV

Building VV is an existing structure that is currently serving as a production area known as "Central Drumming." The area approximately encompasses 150 feet by 225 feet, and functions as an unloading area for liquid materials. These materials are repackaged or blended into smaller quantities from the bulk storage unit. The railroad car unloading area where arochlors were unloaded and pumped into storage is the area identified as a SWMU. PCBs have been detected in soil borings from the area.

Building II

Building II is a paranitrophenetole (PNPt) loading area used in the manufacture of a pet food anti-oxidant. PNPt production occurred at this building between 1910 and 1994. The SWMU is a 10 feet by 100 feet area directly beneath the rail car unloading area.

Former Bulk Chemical Storage Terminal

The former chemical storage area is a rectangular shaped parcel of land 285 feet by 300 feet covering almost 2 acres off the southeast corner of the plant. It was purchased in 1968 and included two 500,000 gallon tanks and two 300,000 gallon tanks. Raw materials used in the production processes at the Queeny plant were unloaded from barges along the Mississippi River bank to the east and pumped into these tanks. The use of this storage area was discontinued in 1987. Currently, the area is overlain by crushed or compacted stone and it is partially surrounded by a security fence.

Former Coal Storage Yard

The former coal storage yard is an area of approximately 2.7 acres purchased from Hagar Hinge in 1982. The property was used to stockpile coal for use as boiler fuel at the plant in anticipation of a coal miner's strike. The property was used only once for coal storage then sold to Schaeffer Manufacturing in 1994. Currently, the area is overlain by crushed stone and coal fines up to two feet deep and lies outside the security fence. TCE has been detected in this area.

Former Quarry Area

A former rock quarry was on land purchased by Solutia from American Car and Foundry in 1953. No historical data is available indicating when the quarry was in operation, though the date is assumed to be in the late 1800's. Solutia back-filled the quarry with construction debris, rubble, and other miscellaneous fill material so that it was completely filled in by 1971. The size of the quarry is estimated to be approximately 450 feet by 450 feet. The depth is assumed to be about 100 feet as indicated by the depth of fill material noted on boring logs from the area. Low levels of metals, volatiles, and semi-volatiles have been detected in the quarry.

Former Acetanilides Production Area (Lasso)

This production area manufactured the herbicide Lasso from 1966 to 1991. The approximate size of the manufacturing area is 300 feet by 450 feet. After Lasso production ceased in 1991, Solutia kept the building and other facilities in tact and they remain today. The majority of the area is currently paved with the exception of the vicinity of the railroad tracks which is overlain by stones.

Boiler Slag Accumulation Area

The boiler slag accumulation area is a small, 25 feet by 25 feet area located northwest of the former Building JJJ boiler house. The boiler house operated from the early 1900's through 1992, when it was dismantled. This area was used as a cooling spot for the clinkers from the bottom of the boiler. The clinkers were placed on this paved spot on the ground by a front end loader, allowed to cool, then picked up by front end loader and deposited in a dumpster for future off-site disposal. Currently, this area is paved. PCBs are the only constituents detected at this SWMU.

RCRA-Regulated Units

As previously stated, the 1989 Facility Hazardous Waste Management Permit issued by DNR covered operations at two regulated hazardous waste units: the hazardous waste incinerator and hazardous waste storage area. The incinerator was closed by Monsanto in 1991 shortly after the permit was issued. The entire incinerator operations were referred to as the CAC Incinerator system that included a CAC residue tank consisting of a 12,500 gallon glass-lined steel tank, a residue feed pump, and associated piping loop. The incinerator consisted of a burner plenum, thermal oxidizer, quench pot, and packed bed scrubber system. Each component of the CAC system was demolished in 1991, containerized, then shipped off-site to a landfill in Louisiana. Soil sampling in the vicinity of the dismantled CAC system did not reveal the presence of any chlorinated/halogenated compounds. The CAC incinerator was located in an area near the Lasso production area.

The hazardous waste storage pad consisted of a concrete pad with dimensions of 30 ft by 50 ft. The ends of the pad were sloped towards the center of the pad to a catch basin and drain and the sides were curbed. The drain was equipped with a shut off valve. The complex was roofed and walled with corrugated fiberglass panels. The pad had been used to store a variety of drummed hazardous wastes including organic solvents, semi-volatiles, heavy metals, acids and bases. A complete list of wastes stored at the pad is contained in the 1994 Closure Report. During closure in 1994, the concrete pad was observed by personnel to be stained but largely in tact with no visible cracks. The pad was rinsed twice and the rinseate containerized and sampled. Sample results indicated low levels of phthalates, mercury, and phenol. Solutia performed a risk assessment using the contaminant levels identified in the rinseate and the risk levels did not appear to pose an unacceptable risk to human health and the environment. The hazardous waste storage area was located at the north end of the facility.

On behalf of EPA, Jacobs Engineering completed a RCRA Facility Assessment at the Queeny plant in January 1989. The report concluded that the SWMUs and site-wide groundwater needed additional characterization and requested Solutia to conduct a RCRA Facility Investigation. In November 1989, the EPA issued a Hazardous and Solid Waste Amendment Act (HSWA) Permit to Solutia at the same time DNR issued a Facility Hazardous Waste Management Permit to store and incinerate hazardous waste. The HSWA Permit included a schedule of compliance for corrective action-related tasks including detailed characterization of the SWMUs. As a result, Solutia submitted a RFI Work Plan in 1990 and reported the ensuing results as part of a RFI Report in 1992. Solutia submitted a Phase II RFI Work Plan in 1993 and the results in 1994.

Based on the results of the two phases of RFI field work, EPA issued Solutia a Notice of Deficiency (NOD) in July 1997 which required, among other things, that Solutia prepare a Data Gap Work Plan to address all areas of the site which have not been adequately characterized. Solutia began preparation of the Data Gap Work Plan and its amendments throughout 1998 and 1999. Fieldwork has recently been completed in the summer of 2000 and the preliminary results submitted in December 2000. These results have been included in the evaluation performed for this CME Report.

2.5 Facility Compliance History

The following is a chronology of the regulatory compliance history relevant to groundwater monitoring, corrective action, and site/waste characterization at the Solutia Queeny plant since 1989, when Solutia (formerly Monsanto) was issued a permit by MDNR. A complete list of correspondence among Solutia, EPA, and MDNR can be found in the Agencies' RCRA files for Solutia.

01/08/89 Solutia (Monsanto) is issued a Hazardous Waste Management Permit by MDNR for the treatment and storage of hazardous wastes. The EPA simultaneously issues Solutia a HSWA Permit that included a schedule-of-compliance for characterizing releases from the SWMUs.

01/12/89 On behalf of EPA, Jacobs Engineering completes the RFA for the Queeny plant. The RFA finds that Solutia needs substantial characterization at its SWMUs to determine the impacts of its waste management practices on soil and groundwater at the facility.

10/17/90 Solutia submits its RFI Work Plan to the EPA, in accordance with the schedule in the HSWA permit.

11/13/90 EPA sends Solutia its comments to the RFI Work Plan, approving the work plan with modifications.

02/28/91	EPA approves the modifications to the RFI Work Plan submitted by Solutia.
05/22/91	Solutia receives certified closure of the RCRA hazardous waste incinerator and residue storage tank.
01/10/92	Solutia submits groundwater monitoring data from its RFI field work to EPA (who subsequently forwards it to MDNR). The data indicate high levels of chlorobenzenes and lower levels of other semivolatile hazardous constituents in the alluvial aquifer beneath Solutia.
03/20/92	Solutia submits its RFI Report to EPA.
09/21/92	EPA submits its formal RFI comments to Solutia, requesting additional site investigation.
04/17/93	Solutia submits its RFI "response-to-comments" letter to EPA accompanied by a Phase II RFI Work Plan.
06/02/93	EPA completes its Phase II RFI Work Plan review and submits comments to Solutia.
08/09/93	Solutia submits a revised Phase II RFI Work Plan to EPA and also submits results of its Building FF field investigation.
10/14/93	EPA submits its approval to Solutia's Phase II RFI Work Plan with modifications proposed to the groundwater portion of the investigation.
06/30/94	Solutia completes its Phase II RFI field work and submits the Phase II RFI Report to EPA.

7/11/94	Solutia submits an additional round of groundwater sampling data to EPA and MDNR.
11/30/94	Solutia submits its Hazardous Waste Storage Pad Closure Report to MDNR.
01/11/95	MDNR notifies Solutia that it had not attained clean-closure of the storage pad due to the apparent presence of hazardous constituents remaining in the subsurface following closure.
10/03/95	Solutia submits its "Preliminary Remediation Goals" to MDNR for the Queeny facility. The goals are based on Missouri Department of Health guidelines for hazardous substance remediation.
06/17/97	EPA submits formal Phase II RFI comments to Solutia. The comments include a denial of Solutia's statement in the report that it could proceed into the corrective measures phase of the corrective action process. EPA stated that the soils and groundwater at the facility needed additional investigation for contaminant presence and extent, and subsequently issued Solutia a NOD.
09/19/97	The official transfer of ownership from Monsanto to Solutia occurs at the Queeny facility.
09/23/97	Solutia submits its response to the list of EPA deficiencies regarding the content of the Phase II RFI Report.

03/10/98	Solutia submits its corrective action only, Part B Permit Application to MDNR.
10/12/98	Solutia submits its groundwater monitoring wells' static water level measurements to MDNR.
11/03/98	Solutia submits its Data Gap Work Plan to MDNR and EPA. The plan outlines additional proposed fieldwork to help fill in the subsurface data gaps remaining after the two phases of RFI fieldwork.
01/04/99	MDNR submits its comments regarding the content of the Data Gap Work Plan to EPA. The comments primarily pertain to additional soil characterization to define the contaminant hotspots and groundwater monitoring well installation procedures.
06/29/99	EPA submits its comments and MDNR's regarding the Data Gap Work Plan to Solutia.
08/23/99	Solutia responds to the agencies' comments and addresses most of them adequately.
09/30/99	Solutia submits a Revised Data Gap Work Plan to MDNR and EPA.
01/24/00	EPA sends Solutia additional concerns regarding the Data Gap Work Plan.
03/24/00	Solutia adequately revises appropriate sections of its Data Gap Work Plan. and is granted approval to proceed with the proposed fieldwork.

06/14/00 Personnel from the MDNR-ESP and DGLS conduct the operation and maintenance field inspection as part of the CME process.

08/07/00 The MDNR-ESP completes its O&M audit of the Solutia facility and submits its report to the Hazardous Waste Program.

08/31/00 The MDNR-DGLS completes its O&M audit of the Solutia facility and submits its report to the Hazardous Waste Program.

12/08/00 Solutia presents its soil and groundwater sampling results from the Data Gap fieldwork to MDNR and EPA representatives. The results indicate that contaminated groundwater exceeding published health-based standards has probably migrated off-site at three separate locations.

3. TECHNICAL EVALUATION

This portion of the CME discusses and evaluates the technical and regulatory adequacy of: 1) Solutia's characterization of the regional and site-specific geology and hydrology, 2) the ability of the groundwater monitoring system to define the horizontal and vertical extent of groundwater contamination resulting from operations at its SWMUs, 3) the adequacy of Solutia's characterization of the uppermost aquifer underlying the SWMUs, and 4) the monitoring well construction procedures for the wells at the Queeny plant.

3.1 Regional Characterization

In general, characterization of a site's regional setting should form the initial basis for development of a detailed site-specific investigation. Regional geologic and hydrologic information is often readily available and is usually sufficient to determine the gross physical and chemical characteristics of soils, bedrock, surface water and groundwater in the site vicinity. Information related to topography, land-use and geologic features at or surrounding a site is also typically available. Regional information should be used as a means to infer the anticipated site-specific conditions and, hence, potential pathways for contaminant movement. This, in turn, should enable expedient development of a site exploration plan and groundwater monitoring system design.

3.1.1 Review of Owner/Operator Information

Solutia's 1999 Data Gap Work Plan contains a relatively comprehensive discussion of the regional geologic and hydrologic characteristics in and around the south St. Louis area. Solutia discusses: 1) gross characteristics of soils and bedrock (i.e., origin, composition, thickness, secondary features); 2) gross hydrologic properties of the region and a list of all nearby water supply wells; and 3) structural and topographic features (i.e., regional uplifting, faulting, surface water drainages). The Work Plan also includes a list of documented groundwater wells in the surrounding area.

3.1.2 Summary of Regional Geology

The State of Missouri north of the Missouri River lies in the physiographic province classified as the Central Lowlands. The Ozark Plateau province lies south of the river, such that the City of St. Louis is geographically situated on the northeastern edge of the Ozark Plateau. St. Louis is situated on a monoclinal structure that is dipping to the northeast. This structure has additional associated features, including anticlines, synclines, and at least one fault. The fault axis lies approximately 1.4 miles west of the Queeny plant, and additional faults have been mapped southwest of St. Louis. Additional structure features include the Cheltenham Syncline, Eureka-House Springs

Anticline, and the Dupo-Waterloo Anticline. Mature karst topography has developed behind the bluffs of the major rivers where carbonates make up the bedrock just below the surface. Coalescing sinkhole fields, losing streams and an extensive cave network are all present in upland areas where the bedrock is composed of soluble Mississippian limestones. Karst features are not as prevalent beneath areas covered with relatively insoluble Pennsylvanian-age shales and clay. Sinkholes are common in the St. Louis area even though, in most cases, the surfacial expression of these features has been masked by urban development.

Bedrock in the St. Louis region consists of the Mississippian System, Meramecian Series; and the Pennsylvanian System, Des Moinian Series; and less predominant Ordovician Mohawkian Series. The aggregate thickness of the Mississippian-aged rocks is approximately 1250 feet. The Meramecian Series formations are found closest to the Solutia site. The stratigraphic sequence of the Meramecian Series from oldest to youngest are: Warsaw, Salem, St. Louis Limestone, and the St. Genevieve Limestone formations. Mississippian-aged limestones in east central Missouri generally tend to be crystalline in texture with some chert, dolomite, and some shale, with the upper portion of the system being predominantly clastic. Bedrock encountered at Solutia during drilling is the St. Louis Formation of the Meramecian Series. This series is described in the book The Stratigraphic Succession in Missouri (1961) as a "gray lithographic to finely crystalline, medium to massively bedded limestone which is more than 100 feet thick." Limestone breccia may occur in the lower portion of the formation. Chert is not common in this area. Blue and bluish gray shale occurs as thin beds throughout the formation. Lithostrotionellid corals are the diagnostic fossils for the St. Louis Formation.

Overlying the bedrock in the St. Louis area are fill, alluvial deposits, and glacial materials. The glacial materials are expressed as tills consisting of silts and clays with some gravel that tend to be very stiff. These materials may possibly be derived from loess or glacial lake deposits. The recognizable glacial materials generally occur in the north St. Louis area. Quaternary age alluvial deposits generally occur along the Missouri, Mississippi, and Meramec Rivers. Most of the surface soils in southern and southwestern portions of the St. Louis area are formed from limestone residuum or from loess.

3.1.3 Summary of Regional Groundwater

Based on a review of the region on behalf of EPA in 1989, it was determined that no drinking water supply wells exist within a one-mile radius of the Queeny plant. In accordance with St. Louis City Ordinance #14866, Section 3, no drinking water supply wells are allowed in the city limits. Solutia's water supply comes from the City of St. Louis, whose source is the nearby Mississippi River. There are two City water supply intakes near Solutia; one 1.5 miles upstream to the north and another 5 miles upstream to the north. The nearest downstream water intake is 68 miles to the south in Chester, Illinois.

In 1995, a well search was conducted by Science Applications International to determine if any industrial water wells were present in the area. They identified the following wells that were included in a report provided to the EPA:

1) Bouckaert Packing Company – They used one well for a cooling tower water source prior to 1980. The well was abandoned and cemented at the surface.
2) Yellow Freight – Numerous monitoring wells were reported to exist due to site remedial activities. Some of the boring logs were provided in the EPA report, but Yellow Freight has denied access to the site for well inspections.
3) Rhone Poulenc – Two groundwater monitoring wells exist on their property for observation purposes. Rhone Poulenc has provided a boring log for one of the wells to EPA.
4) Schneider Packing – One well to provide water for cattle was constructed and abandoned after it did not yield sufficient volume. No documentation of well abandonment is available. The well reportedly was 150 deep and could only produce water for about ten minutes at a time.

5) Anheuser Busch – Two or three monitoring wells are reportedly in existence on this property south of the Queeny plant. No other information has been provided in the EPA report.

6) Ethyl Petroleum Additives – One monitoring well that is not currently being used is reportedly on this property. No information on this well is available.

7) Penske Truck Leasing Company - Fifteen monitoring wells are reportedly on the property to monitor a release to the subsurface. No other information is available.

The quantity of producible groundwater in the area varies with depth and location. Large amounts of fresh water are stored in the bedrock and alluvium, although the alluvial aquifers are generally more productive than the bedrock aquifers. Alluvial wells can produce water up to a rate of 1000 gallons per minute (gpm). Shallow bedrock wells, with completion depths less than 300 feet, generally yield 10 - 15 gpm. However, deeper bedrock wells, with completion depths deeper than 500 feet, can produce between 50 to 465 gallons per minute.

Groundwater quality varies greatly with depth and location. Shallow groundwater from wells completed in Pennsylvanian-age bedrock generally has a higher content of dissolved solids than groundwater from wells completed in alluvium or the deeper Mississippian, Ordovician and Cambrian bedrock. All shallow sources of groundwater are subject to pollution because of sinkholes, fractures and enlarged bedding planes that allow surface water to enter the shallow aquifers.

St. Louis is supplied with potable water through a metropolitan water district. Intakes for the water supply are located on the Mississippi River.

3.2 Site Characterization

The objective of site characterization should be to collect information sufficient to develop a comprehensive three-dimensional conceptual model of the subsurface at the site. In achieving this objective, special emphasis should be placed on the quantification of physical/chemical subsurface material properties and identification of potential groundwater flow pathways. It should be noted that all of Solutia's site characterization information was obtained from direct exploration methods (i.e., exploration borings, monitoring wells, physical materials testing) and available literature for the area. No indirect or non-intrusive techniques were used to supplement these direct exploration methods.

3.2.1 Owner/Operator Information

3.2.1.1 Narrative Discussion of Geology

In its 1999 Data Gap Work Plan, Solutia provides a good narrative description of site geology and groundwater characterization. It provides details of the ten stratigraphic units encountered during several site investigations conducted at the facility. The following descriptions are paraphrased from the Work Plan:

Limestone Bedrock

The upper bedrock identified at the Solutia site is a limestone from the St. Louis Formation of the Meramecian Series. The limestone is described in boring logs from the facility as finely to coarsely crystalline, fractured, and weathered. Fractures may be filled with clay or secondary mineralization. No boring has penetrated the entire thickness of the St. Louis formation, so its thickness at the site is undetermined. The upper portion of the bedrock surface was reported to have a 10 feet thick weathered interval in some areas of the site.

The bedrock surface is uneven with a topographic high near the center of the site and lows in the north and south. The bedrock surface generally slopes to the east towards the Mississippi River as shown on Figure 5 of Solutia's Data Gap Work Plan. A reduced version of Figure 5 is contained in Appendix B of this CME Report. The figure also indicates two bedrock low points near the middle of the site approaching 40 feet deep. Three additional bedrock lows occur in the northern portion of the site near Building KK, near the area of the former quarry, and at the south end of the former coal storage yard. The northern bedrock low near MW-2 may reflect a former erosional stream channel. The highest bedrock elevation is approximately 418 feet above mean sea level (MSL) near Building VV. The lowest bedrock elevation reported is near Building AD at 325 feet above MSL.

Clayey Silt 1

Clayey silt 1 is described on boring logs as a mixed gray to brown to yellow clayey-silt that is gravelly at the bottom and more clayey near the top. This unit is found in the vicinity of MW-1A/B and pinches out rather quickly to the east and south. The unit is reportedly approximately seven feet thick.

Clay 1

Clay 1 is described on boring logs as a yellow to olive brown moist, cohesive, moderately to highly plastic stiff clay with small amounts of sand, chert, and gravel. This unit is found near wells MW-1A, MW-18A, and OBS-1, and appears to pinch out to the east and south.

Sand 1

Sand 1 is the most extensive unit and the thickest of the alluvial units encountered at the northern portion of the site. Sand 1 is found in the northern portion of the site between wells MW-7A and MW-8A. It varies in thickness between 50 and 60 feet before it thins to the south, southwest, and southeast towards the bedrock high in the middle of the site. Where clayey silt 1 and clay 1 pinch out, sand 1 contacts the bedrock. Sand 1 apparently fills a former erosional stream channel in the bedrock. Sand 1 is described on boring logs as a light brown to grayish brown, moist to wet, fine to medium-grained sand body. Sand 1 is occasionally gravelly with well-rounded pebbles, with small lenses of silt and clay present. Sand 1 ends between MW-9 and MW-10 where it grades into Silt 1.

Silty Clay 1

Silty clay 1 overlies Sand 1 and varies in thickness throughout the middle of the site. Silty clay 1 is not continuous, however, due to construction activities. Silty clay 1 is described on boring logs as a grayish brown to olive brown, moderately cohesive, soft to firm, silty clay. It is described as a clayey silt on the northern portion of the site and a silty clay over the central bedrock high. The unit contains some sand and gravel and exhibits iron staining in its upper portions. This unit ranges in thickness from 13-23 feet north, 58 feet thick at OBW-1, and 4.5-10 feet thick on top of the bedrock high.

Silt 1

Silt 1, as described on logs from MW-9 and MW-10, is a dark olive gray moist, soft, clayey to sandy silt approximately 27 feet thick. This unit is not extensive and pinches out prior to MW-5 between MW-10 and MW-13.

Fill

Fill is the most extensive and continuous overburden unit, with thicknesses ranging from 2-32 feet in the northern portions of the site. The fill material is comprised of both native alluvial soils and non-native debris such as ash, cinders, bricks, glass, pottery, construction debris, coal fines, and gravel. In the former Lasso production area, the fill was noted to contain chat. In the quarry area, the mined rock has been replaced with over 100 feet of fill material. The quarry walls are thought to be nearly vertical extending up 100 feet to an elevation of 400 feet above MSL. Fill in the former coal yard is overlain with two feet of a coal layer.

Sand 3

Sand 3 is described as a yellowish-brown wet, rounded, medium to coarse-grained sand with some silt, clay, gravel, and limestone fragments in it. This channel sand unit thins and becomes more coarse to the northeast from MW-15. There is no correlation among sand 1, sand 2, and sand 3 site-wide.

Sand 2

Sand 2 is described as an olive gray, brown, or tan, moist fine-grained sand unit that grades downward to a more coarse-grained sand. Sand 2 is only found in the southern portion of the site near the coal storage yard and bulk chemical storage area. The sand unit's thickness varies from 22 feet to 53 feet.

Silty Clay 2

Silty clay 2 is described as an olive gray to brown silt and clay mix found in the southern part of the site. The unit is noted as being "mottled" on two boring logs. The unit generally grades downward into a very fine sand. The unit's thickness ranges from four feet to 30 feet.

Groundwater Characterization

Solutia refers to the different saturated alluvial units as hydrostratigraphic units for the purposes of groundwater discussion. While the properties of each unit may vary widely, the entire saturated alluvial interval, in conjunction with the upper, weathered limestone, could be considered as one interconnected upper aquifer for a regulatory definition of an upper aquifer. Precipitation infiltration is expected to migrate downward into the fill and Silty Clay 1 units and further downward into the sandy units. With the absence of any significant sandy alluvium in the center of the site, shallow groundwater appears to migrate radially away from the bedrock high near the former Lasso production area. Groundwater originating north of the high appears to migrate towards the northwest and down into the sands prior to migrating more towards the Mississippi River to the east. Groundwater flow on the south of this high appears to flow towards the southwest initially then towards the Bulk Chemical Storage Terminal on the southeast corner of the site. Potentiometric and contaminant data appear to confirm this.

Groundwater migration in the sands is expected to be more horizontal towards the Mississippi River. Closer to the river, there has shown an upward flow potential from the upper bedrock to the overlying sands for eventual discharge in the river. The Mississippi River has been shown to be the major discharge point for the saturated limestones in the area. Hydraulic properties of the saturated units encountered at Solutia will be discussed in greater detail in the following subsections of this CME Report.

Solutia has also addressed, at the request of EPA, the degree of influence river level changes have on the measured monitoring well potentiometric surface in each alluvial hydrostratigraphic unit at the site. The study focused on each unit's interconnection with the river, the amplitude of a response to river level changes, and the timing of a significant response. As would be expected, the study determined that the more permeable, deeper sands exhibited a significant response to river level changes, though at decreasing amplitudes with further distance from the river. Potentiometric levels measured in the upper limestone bedrock have also showed a direct response to changing river levels, with the exception of well MW-21R. Well MW-21R is the furthest bedrock well from the river and actually exhibited a reverse effect to changing river levels.

3.2.1.2 Diagrammatic Representations of Hydrogeology

Solutia has prepared and submitted numerous potentiometric surface maps for each alluvial unit and upper bedrock, geologic cross-sections, a top of bedrock contour map, and trend charts showing correlations between Mississippi River levels and potentiometric surface elevations in many of the monitoring wells completed at the facility. Most of the historical boring logs prepared after the numerous phases of site investigation were not reproduced in the Data Gap Work Plan and, thus, are not contained in DNR files for Solutia. Geologic maps are contained in Appendix B of this CME report, while potentiometric surface maps are contained in Appendix C.

3.2.1.3 Hydraulic Conductivity Testing

The first in-situ hydraulic conductivity test was performed at Solutia in June 1991. A pump test was performed on well TW-1 screened in the alluvial unit identified as Sand 1. Water level responses were measured in 17 wells, though only four of the wells were screened within the same sand unit. It should be noted that the test was conducted over a period of time when the Mississippi rose approximately two feet, which affected the ability to evaluate the pump test data. The interpretation of the data revealed a sand hydraulic conductivity range of 0.036 – 0.091 cm/sec.

Slug tests were performed on wells MW-1 through MW-11 in 1984 and wells MW-12, MW-14, MW-16, and MW-18 in 1985. Results for MW-7B and MW-8A were reported to be two orders of magnitude lower than the results of the pump test (0.00006 – 0.00097 cm/sec). Other wells reported to yield representative test results are MW-14 (0.004 cm/sec) and MW-18A (0.00056 cm/sec). Slug tests on wells screened within Silt 1 resulted in calculated hydraulic conductivities ranging from 0.00005 – 0.00097 cm/sec.

Tables 3 & 4 in Appendix D of this CME contain a summary of facility in-situ hydraulic conductivity tests results.

3.2.1.4 Groundwater Flow Determinations

Solutia has prepared and submitted three potentiometric maps in its Data Gap Work Plan. Solutia groups potentiometric data obtained from wells screened within the fill and more fine-grained, upper alluvial materials to prepare a shallow groundwater flow map. Solutia uses data from wells screened in the lower silts and sands to prepare a deeper groundwater flow map. Both of these maps are far too large to reproduce for this CME Report. Solutia has also prepared a bedrock groundwater contour map indicating flow towards the northeast. In its presentation of the Data Gap groundwater-related fieldwork, Solutia provided smaller versions of its three potentiometric maps for the shallow alluvium, deep alluvium, and saturated bedrock intervals. These are contained in Appendix C of this CME Report.

Groundwater surfaces in wells screened within the clayey fill material typically lie 6-10 feet below ground. At the northern portion of the site, shallow groundwater seems to flow towards the northeast. In the southern portion of the facility, groundwater flow direction appears to be towards the southeast. Groundwater flow from the center of the site appears to be radial, with flow from the bedrock high migrating either northwest or southwest prior to migrating more towards the Mississippi River. Calculated groundwater flow gradients range from 0.004 ft/ft to 0.011 ft/ft, and calculated velocities ranged from 0.27-0.48 m/day.

In the silty clays, the hydraulic gradient was calculated in a range from 0.006-0.009 ft/ft. Calculated velocities ranged from 0.002-0.004 m/day. In the sands, hydraulic gradients ranged from 0.001-0.02 ft/ft and velocities from 1.2-1.6 m/day. Groundwater levels measured in wells screened in the lower sands typically range from 12 feet to 36 feet below ground.

During the pump test, some bedrock wells exhibited a response to the pumping of groundwater out of wells completed in the lower alluvial sands. Horizontal groundwater flow in the upper limestone bedrock appears to be east-northeast towards the Mississippi River under an approximate hydraulic gradient of 0.007 ft/ft. Depth to groundwater in bedrock wells resembles depths in nearby sand wells, ranging from 10 feet to 33 feet below ground. Closer to the river, bedrock wells have potentiometric surfaces that are slightly higher than adjacent wells screened in the sands. There is apparently an upward component of groundwater flow from the bedrock to the sands. Just the opposite is true when comparing wells screened in the upper silty clays and fill material. There is up to a four feet head difference in potentiometric surfaces when comparing shallow wells with sand wells. This apparent downward flow potential from the silty clays to the sand bodies, combined with the upward flow potential from the bedrock to the sands, would indicate that the sands are the primary interval of concern for contaminant transport off-site towards the river.

3.2.1.5 Upper Aquifer/Confining Unit Determination

The primary goal of groundwater monitoring at hazardous waste sites once a release has been confirmed is to determine the full extent of groundwater contamination in the upper saturated unit. The extent cannot truly be characterized without first knowing the definition of the upper saturated unit, or in the case of Solutia, all hydraulically connected saturated units. This involves distinguishing the hydraulic properties of each interval in order to identify preferential contaminated groundwater flow pathways and identifying a lower confining unit which has been demonstrated to have a sufficiently low hydraulic conductivity to impede further migration of contaminants.

As discussed previously, Solutia has gone a long way in determining and distinguishing among the various saturated alluvial and upper bedrock units encountered beneath the Queeny facility. Solutia has identified the sand units as the preferential groundwater migration units and, hence, contaminant flow pathways at the site. Solutia has also identified various upper bedrock highs and lows as indicated in Figure 3 in Appendix B. These bedrock depressions would be preferential accumulation points for the DNAPL known to exist at the site (DNAPL and LNAPL will be discussed in the next sections of this CME).

However, Solutia has not identified a unit that could be considered as a lower confining unit, or "aquitard", at the facility. Contaminant presence in wells screened exclusively in the upper bedrock have confirmed that the bedrock either is not sufficiently competent or does not have the property of a sufficiently low hydraulic conductivity to impede downward migration of contaminants. As such, in its RFI Report Solutia must evaluate the potential for contamination to migrate within the bedrock through fractures, a weathered interval, or any other features which can promote transport of dissolved phase or free phase contaminants.

3.2.2 Summary of Owner/Operator Hydrogeologic Characterization

A July 1997 letter from EPA to Solutia listed several elements of hydrogeologic characterization that had been inadequate up to that point. The following bullets are paraphrased from the letter:

- Solutia needs to group existing monitoring wells together according to which hydrostratigraphic unit they monitor, from which an evaluation needs to be conducted of whether there are sufficient wells in each zone to define and monitor the extent of groundwater contamination.

- Since the last groundwater data was obtained in 1994, additional water level measurements need to be obtained to determine both the seasonal and temporal groundwater flow variability. Site-specific groundwater flow patterns and velocities need to be evaluated from this new data in conjunction with previous hydraulic conductivity test results.
- The hydrogeologic relationship between the saturated alluvial units beneath the site and the Mississippi River should be evaluated and presented in a narrative report and represented by appropriate diagrams.

In its 1999 Data Gap Work Plan, Solutia included evaluations of the latter two of these EPA-requested tasks.

Overall, Solutia has done an adequate job of defining the upper aquifer at the facility and distinguishing among the properties of each alluvial unit encountered beneath the site. The only deficient part of its investigation to date is that of evaluating potential groundwater, and hence, contaminant migration within the bedrock.

3.2.3 <u>Other Site-Specific Hydrogeological Information</u>

The following section contains a compilation of other relevant area hydrogeologic information obtained from sources other than Solutia, including the DNR-DGLS.

The approximate depths and thickness of bedrock formations can be interpolated from a sample log taken from an industrial, high-capacity well located ½ mile northwest of the Solutia site. The table on page 42 of this CME summarizes the stratigraphy and formation depths and thickness in the vicinity of the site.

The first competent bedrock below the site is the Mississippian-age St. Louis Limestone (90 feet thick). It is a very hard light yellow to grayish rock, mostly pure carbonate but may contain some gray, breccia beds and dolomite pseudo-concretions. The Salem Formation underlies the St. Louis Limestone. The Salem Formation (140 feet thick) is a white to blue-gray, argillaceous, locally oolitic, cross-bedded limestone. A distinctive "bulls-eye" chert nodule zone occurs near the top of the Salem Formation and indicates the approximate contact with the St. Louis Limestone. The Warsaw Formation underlies the Salem Formation. The Warsaw Formation (110 feet thick) is buff to gray, argillaceous limestone interbedded with green calcareous shale. The Burlington-Keokuk Limestone undifferentiated underlies the Warsaw Formation. The Burlington-Keokuk Limestone undifferentiated (155 feet thick) is coarse grained, white to brownish-gray, cherty, crinoidal, massive limestone. The Fern Glen Formation underlies the Burlington-Keokuk Limestone undifferentiated. The Fern Glen Formation (60 feet thick) is a gray-green to red, fossiliferous, thickly bedded limestone with the upper portion of the formation being cherty. A thin red shale marks the bottom of the Fern Glen Formation. The undifferentiated Chouteau Group underlies the Fern Glen Formation and forms the basal unit of the Mississippian System. The Chouteau Group (40 feet thick) is made up of discontinuous limestone and rests unconformably on top of the Devonian System.

The Devonian System is represented by the thin presence of the Grassy Creek Shale. The Grassy Creek Shale (3 to 20 feet) is a gray-black, fissile, carbonaceous shale. The Grassy Creek Shale rests unconformably on the undifferentiated Silurian dolomites. The Silurian dolomites (40 to120 feet thick) are silty and contain some small amounts of chert.

The Silurian limestones rest unconformably on the Ordovician-age Maquoketa Shale. The Maquoketa Shale (140 feet thick) is a blue-gray, often calcareous, platy shale. Below the Maquoketa Shale are some 2860 feet of Cambrian and Ordovician-age limestones, dolomites and sandstones that comprise the Ozark Aquifer. The Maquoketa Shale forms an important upper confining unit for the underlying Ozark Aquifer.

Bedrock at the Solutia site dips gently to the east into the Illinois Basin. The St. Louis Fault is the nearest bedrock structure and is located 1.5 miles to the west. This vertical fault strikes N. 5° E. and has a net offset of 10 feet. The Solutia site is on the down-thrown side.

The axis of the Dupo Anticline lies 2 miles east of the Solutia site. The Dupo Anticline strikes north-northwest and has a gentle slope on the east side and a steeper slope on the west side. This anticline has a history of natural gas production as well as small amounts of oil.

The nearest notable karst feature to the Solutia site is a sinkhole in Lafayette Park located approximately 1.25 miles west-northwest of the site. Other sinkholes may be closer to the site, but their presence has been obscured by development.

STRATIGRAPHIC COLUMN - Solutia Site

Alluvium	60	0 – 60	420 – 360
St. Louis Limestone	90	60 – 150	360 - 270
Salem Formation	140	150 – 290	270 - 130
Warsaw Formation	110	290 – 400	130 - 20
Burlington-Keokuk Limestone undifferentiated	155	400 – 555	20 – (-135)
Fern Glen Formation	60	555 – 615	(-135) – (-290)
Chouteau Group	50	615 – 655	(-290) – (-340)
Grassy Creek Shale	20	655 – 675	(-340) – (-360)
Silurian limestones	120	675 – 795	(-360) – (-480)
Maquoketa Shale	140	795 – 935	(-480) – (-620)
Ordovician System Carbonates and Sandstone	1470	935 – 2405	(-620) – (-2090)
Cambrian System Carbonates and Sandstone	1390	2405 – 3795	(-2090) – (-3480)

Table 1. The stratigraphy from the surface to 795 feet below the surface was derived from the interpretation of data collected from a well located in NW ¼, NE ¼ Section. 26, Township 45 N. Range 7 E. (Missouri well log 3089). The stratigraphy from 795 feet to 3795 feet below ground surface was interpreted from data collected from a well located in SW ¼, SE ¼, SW ¼, Section 30, Township 45 N. Range 7 E. (Missouri well log # 2460).

3.3 Groundwater Monitoring System

3.3.1 Well Construction Practices

Solutia has conducted numerous phases of groundwater investigations that resulted in the construction of groundwater monitoring wells. During 1983 and 1984 as part of preliminary investigations, 28 wells were installed. In 1988 as part of the Building FF, Acetanilides Production Area, and coal storage yard investigations, thirteen monitoring wells and four DNAPL recovery wells were installed. As part of the Phase I RFI investigation in 1992, five monitoring wells, one 8" diameter test well, and a 4" diameter observation well were completed to conduct an aquifer test within the alluvium. In the summer of 2000, Solutia completed an additional 13 monitoring wells as part of its Data Gap Work Plan.

DNR does not have completed monitoring well construction diagrams for any of the wells at Solutia. However, the Data Gap Work Plan provides a narrative description of the completion of each well and provides a table listing each well's monitored stratigraphic unit, total depth, screened interval, and encountered bedrock depth (if applicable). A copy of this table is provided in Appendix E of this CME Report. Solutia has completed a total of 74 monitoring wells, four product recovery wells, and ten piezometers at the facility. Solutia has reported that 16 of the wells have been closed, though no abandonment information has been documented. Additionally, wells GM-4 and GM-5 have been paved over and "lost."

Thirty-five of the wells are screened across only one alluvial or bedrock unit, while 18 others are screened across several units. Wells MW-2R and MW-21R were completed open hole, with no casing advanced or screened in the monitored bedrock interval. Both of these wells had a shallow 10" casing and an intermediate inside 8" casing grouted to the surface. The recovery wells were installed to remove tetrachloroethylene (PCE) from the bedrock surface. Twenty feet of 4" well screen with a five feet solid sump were installed to depths ranging from 5-8 feet inside the limestone. The recovery wells had actually been completed below ground in a vault setting. Access to the wells had been through a manhole that required a confined entry permit prior to sampling by Solutia personnel. During the summer of 2000, Solutia eliminated the vaults and extended the riser pipes to the surface of the asphalt parking lot in the vicinity.

The narrative provided in the Data Gap Work Plan appears to indicate that the remaining wells had been constructed in a more traditional manner. The screened intervals typically were five to ten to fifteen feet in length, with filter packs ranging from one to five feet above the top of the screened intervals. The problems with most of the wells identified by DNR inspection personnel are with the surface completions of the wells. Lack of collision protection, missing or severely damaged surface pads, and/or lack of casing covers are just some of the issues Solutia must address. In addition, Solutia should identify which wells are damaged so severely that collection of a representative groundwater sample would be suspect. Solutia must abandon these identified monitoring wells in accordance with Missouri laws found in 10 CSR 23 – 4.080. Solutia should also identify which wells are no longer needed in the groundwater monitoring program for assessing the contaminant levels and their migration in a horizontal and vertical direction from the source areas. These issues will be further discussed in the following two subsections of this CME report and Section 4.3.

3.3.2 Groundwater Monitoring Well Configuration

3.3.2.1 Horizontal Contaminant Extent

In December of 2000, Solutia provided DNR with groundwater data obtained from the Data Gap Work Plan fieldwork conducted during the summer of 2000. Two of the goals of the summer 2000 field work were to identify the extent of the groundwater contamination in each hydraulic interval and determine at what areas of the facility groundwater contaminant levels above published health-based standards had the potential to migrate off-site.

In the Data Gap Work Plan report, Solutia provided contaminant extent figures depicting the extent of groundwater contaminants in the upper silt clay alluvial interval and the lower, sandy interval. There is one figure for each interval depicting the combined extent of all groundwater contaminants, and separate figures depicting the extent of PCE, Chlorobenzene, Toluene, Alachlor, and total PAHs. Each of these figures have been reproduced and contained in Appendix F of this CME Report.

Figure 19 shows the extent of PCE in the upper saturated silty clay interval. The figure shows two separate plumes PCE plumes, one near the Lasso (Acetanilides) area and the other near Building FF. The plume near the Lasso area appears to be bound by PCE-free well samples from MW-11A, MW-26, MW-13, and MW-5. The plume depicted on Figure 19 shows PCE presence near wells GM-1, GM-2, GM-3, and MW-14, all four of which are screened in the shallow zone. None of these well samples had detections of PCE during the summer 2000 sampling event or the previous sampling event in 1991. It is not clear why the figure depicts a northern migration of PCE when the data does not justify it. It is possible that the plume has migrated further south towards HW-2. HW-2 had a detection of PCE at 9.6 ppb, but two wells located between the depicted plume and HW-2 (MW-11B&C) did not have any detections.

The larger, more concentrated PCE plume appears to originate from the FF Building. Detections ranging from 3.4 - 59,000 ppb are found within the depicted plume boundary in Figure 19. The plume is bound on three sides by PCE-free samples in wells MW-18B, Piezometer-1, MW-19, and MW-2B, all of which are screened in the silty clays. There are no samples obtained from the shallow groundwater to the south of the source area (south of Russell Ave.), but given the potentiometric data provided by Solutia, the plume would be expected to migrate towards the north-northeast.

Figure 20 depicts the groundwater contaminant plume for the detections of Chlorobenzene. The figure shows three areas of Chlorobenzene contamination in the shallow groundwater near the FF Building, Lasso Area, and the Former Bulk Chemical Storage Terminal. The plume near the Lasso Area more than likely has migrated off-site to the east across First Street, as the furthest downgradient well sample (MW-13) had a detection of Chlorobenzene at 1400 ppb. At the southeast corner of the facility, levels of Chlorobenzene as high as 4800 ppb were detected at the facility property. It is also assumed that these levels have migrated off-site towards the east. No off-site wells or Geoprobe sampling points have been installed to confirm this assumed migration in the shallow groundwater.

Figure 21 depicts the extent of Toluene and Alachlor contamination in the shallow groundwater. The Toluene contamination appears to be confined to a relatively small area in the vicinity of Building FF. The levels of Toluene approach 6000 ppm, which greatly exceeds the solubility of Toluene in water of 526 ppm. This certainly implies that free product is in the vicinity of wells PZ-FF2&FF3. The Alachlor data indicate that the plume has migrated at least up to the edge of the property on the east along First Street and the south near Barton Street. Two wells along the eastern perimeter of the Alachlor plume had detections under 3 ppb, while the southern perimeter well had a detection of 8 ppb.

The final plume figure prepared by Solutia for contaminants in the shallow groundwater is for the total PAH constituents (Figure 22). Figure 22 indicates that in addition to a PAH plume near the center of the site at Building FF, PAHs appear to be migrating off-site at three locations. These include the northeast corner near Building KK, across First Street near wells MW-13 and MW-26, and the southeast corner of the site at the Bulk Chemical Storage Terminal. None of these plumes has a downgradient PAH-free sampling point to confirm the extent of migration. The highest levels of PAHs are at the Former Bulk Chemical Storage Terminal.

Solutia has also prepared a series of figures depicting contaminant plume extent in the saturated sand units found in the northern and southeastern portions of the site (Figures 24-28). Figure 24 depicts PCE migration, and when compared with the corresponding shallow PCE plume figure (19), it can be shown that the migration of PCE has been significantly farther in the sand than in the silty clays from the source area near Building FF. PCE has apparently migrated off-site as evidenced by a 61 ppb detection at well

MW-8A. Low-level detections at TW-1 and MW-7B are indications that the leading edge of the PCE plume has migrated across Carroll Street off-site. It should be noted that no sand interval sampling has been performed at the source area near Building FF, but deeper bedrock sampling has been reported. The contaminated bedrock sampling points have allowed Solutia to infer that the contaminants are also in the sand beneath the source area. At the southeast corner of the facility, off-site PCE migration has been indicated by detections of PCE at HW-1B of 38 ppb. Solutia did not include plume extent figures of 1,2-DCE, but it should be noted levels exceeding 1000 ppb of this constituent were detected near the southeast property boundary at the HW-1 cluster and lower levels were detected at the Former Bulk Chemical Storage Terminal.

The Chlorobenzene and PAHs contaminant extent figures for the saturated sand interval roughly coincide with the PCE plume. Each of these contaminant plumes appears to migrate off-site near the KK Building on the northeast and across Victor Street to the southeast. The figures and tabulated contaminant data indicate that Alachlor has not migrated out of the upper silty clay saturated interval down into any of the sand units being monitored at the facility.

3.3.2. Vertical Contaminant Extent

To evaluate potential downward migration of contaminants at the facility, Solutia has installed and sampled seven bedrock wells. Solutia has prepared a series of contaminant plume extent figures (29-33 in Appendix F) and a top of the bedrock contour map (Figure 15) which is color coded to aid in evaluating potential bedrock low spots which may hold free product deposits. Two of the bedrock wells, OBW-3 and MW-21R, are completed in an area of the bedrock high across the center of the Queeny plant. MW-13R is completed in the area that was quarried in the late 1800's. Wells OBW-1&2 are completed within a decreasing bedrock surface area away from the Building FF chlorinated solvent source area.

The sample from well MW-13R yielded low levels of Alachlor and PCE. Both of these constituents were detected upgradient of MW-13R in the shallower silty clays, but were not detected in the companion well MW-13 screened in the shallower silty clays. Chlorobenzene was detected in the companion well sample at 1400 ppb in the silty clays but was not detected in MW-13R completed in the bedrock. These data suggest contaminant movement downward from the alluvium either on the bedrock surface or within the weathered interval of the bedrock near the source area prior to lateral migration towards MW-13R. No downward movement is apparent near the MW-13 cluster.

Relatively high levels of Toluene, Chlorobenzene, and PCE have been detected in the two OBW wells completed near the Building FF area. The plume depicted on Figure 29 appears to be bound by a low-level PCE hit of 5.2 ppb upgradient of the assumed source area at well MW-21R and by non-detects in a cross-gradient position at wells MW-2R and OBW-3. It is not clear if the detection at MW-21R is an anomaly, indicative of another low-level source near the BP Building, or is the upgradient limit of the main PCE and Chlorobenzene plumes originating near Building FF. There are no shallow sampling points in the vicinity of MW-21R and no deeper sampling points between the OBW-1 and MW-21R. MW-21R had detections of PCE, Chlorobenzene, and Alachlor, while the OBW-1 sample had no detections of Alachlor. This may be an indication of another source area near Building BP.

The low-level detections of PCE and Chlorobenzene at well MW-8R could be indicative of an actual upper bedrock plume migrating from Building FF to the northeast corner of the site, downward migration of contaminants from the confirmed shallower contamination near Building KK, or low levels of contaminants being introduced to the saturated bedrock interval during drilling. There are no bedrock sampling points between Building FF and Building KK to determine the full impact of contamination within the upper bedrock. Neither level of these two constituents exceeds the EPA MCL. The PCE level of 12 ppb at MW-13R is noteworthy because it exceeds the MCL of 5 ppb for PCE and is located at the eastern property boundary of Solutia. The levels of PCE and Chlorobenzene exceed MCLs at well MW-21R, which also is located at the property boundary near 2nd Street.

3.3.2 Summary of Contaminant Extent Issues

Though Solutia has installed and sampled numerous groundwater monitoring wells at its Queeny facility, there are still contaminant extent issues which must be addressed either as part of the RFI or CMS phase of corrective action investigation. Here is a summary of the major DNR concerns:

1) The full horizontal extent of groundwater contamination in each saturated alluvial interval has yet to be determined. Specifically, the off-site impacts have not been investigated in the areas near Building KK, east of the Quarry Area, and the Former Bulk Chemical Storage Terminal. Solutia has stated that they desire to establish risk-based clean-up standards for the groundwater at the facility. Once these standards have been determined, it will be Solutia's responsibility to either restrict groundwater contamination exceeding these levels from migrating off-site or if off-site levels are reasonably determined to be currently exceeding these standards Solutia must determine at what extent prior to addressing it during corrective measures. DNR realizes that off-site conditions will make

construction and maintenance of permanent monitoring wells difficult east of the property boundary due to the proximity of the railroads, paved roads, and the Mississippi River. Solutia may be able to place temporary monitoring points (i.e., a Geoprobe) in these restrictive areas to determine if levels off-site are exceeding health-based risk standards and/or if eventual corrective measures are actually having an effect on remediating and/or preventing off-site groundwater contamination.

2) Solutia needs to include as part of the Final RFI Report an evaluation of potential groundwater contaminant migration within the saturated upper bedrock. It is not clear from the data presented whether there are local "pockets" of contamination within the bedrock or whether there is a site-wide bedrock contaminant problem. It is also not clear what dominant migration pathways could affect off-site flow of contaminants within the bedrock. An attempt to answer or address the following three questions should be part of this evaluation: Is there significant fractures in the limestone? Is there a relatively thick weathered interval that allows flow of dissolved phase and/or free phase contaminants? Is there an upward tendency of flow from the bedrock to the more permeable sand intervals?

3) Solutia must submit the raw, uninterpreted analytical data from the laboratory for the groundwater sampling and analysis conducted during the summer of 2000.

From the tabular summaries of the detections of hazardous constituents submitted thus far by Solutia, it is not clear whether constituents not listed were non-detects or if they just had not been included in the analyses by the analytical laboratory. The boundaries of the groundwater contaminant plume extent figures drawn by Solutia are largely inferred, and these inferences cannot really be evaluated by DNR for accuracy without knowledge of where actual non-detections are for each constituent. It is not clear why on some of the plume extent figures Solutia has extended the assumed boundary beyond sample points yielding non-detects for the corresponding constituent, and other assumed boundaries appear to not reach far enough downgradient. Some of the "separate" plumes indicated on the figures may actually be part of a larger plume with data gaps between the two separate plumes. Solutia should fully explain the rationale for their assumed plume boundaries in its upcoming RFI Report.

4) Solutia should devote a section of the RFI Report to the evaluation of potential source areas (NAPL) and the possible interconnection of source areas with preferential pathways which could induce the product to migrate either off-site, deeper into the sub-surface, or even into the Mississippi River. Groundwater contaminant levels of Toluene, Chlorobenzene, PCE, and Alachlor are all sufficiently high to be indicative of free product presence.

4. OPERATION AND MAINTENANCE OF GROUNDWATER MONITORING SYSTEM

4.1 Introduction

The primary objectives of this section are to determine if:

1) Solutia's subsurface measurement procedures and groundwater sampling and analysis protocols are capable of yielding reliable, consistent, and representative hydrologic and analytical data; and
2) Solutia's monitoring wells are maintained in a manner that ensures structurally sound wells.

To support these objectives, the HWP employed the services of MDNR's' Division of Geology and Land Survey (DGLS) and Environmental Services Program (ESP) on June 14-15, 2000. Groundwater samples for this CME were split during a scheduled sample collection event conducted by Mr. Larry Lehman of the ESP and Messrs. Rich Koening, Matthew Foresman, Eric Page, Jim Barker, and Eric VanEck representing Solutia. Mr. Robert Murphy of the MDNR-HWP, Mr. Kurt Hollman from DGLS, and Mr. James Dunajcik representing EPA's contractor Tetra Tech EM Inc. also participated in the field audit.

Potentiometric measurements and total well depth measurements made by Mr. Kurt Hollman of the MDNR-DGLS were compared to the facility's results. DGLS observed and critiqued the measurements, well purging, and overall monitoring well structural integrity.

4.2 Sampling and Analysis Plan Content

As part of an operation and maintenance audit of a hazardous waste site's groundwater monitoring program, MDNR reviews the facility's groundwater Sampling and Analysis Plan (SAP) to make sure it contains the integral elements of a sampling plan as stated in EPA guidance documents. MDNR has condensed the elements of an adequate SAP and listed them all on a SAP worksheet. MDNR typically completes these worksheets and provides a copy of it to hazardous waste facilities to aid them in preparation of an adequate SAP. Adequate SAPs are a regulatory requirement of 40 CFR 264 and 265 Subpart F and typically a detailed requirement of Hazardous Waste Facility Post-Closure Permits. Solutia is not yet subject to the provisions of a post-closure permit but is expected to be in the future.

Solutia does not actually have a stand-alone document that could be considered a groundwater SAP. As part of Solutia's Data Gap Work Plan, Solutia included a Health and Safety Plan in Appendix J, a Field Sampling Plan in Appendix H, and a Quality Assurance Project Plan bound separately as Appendix I to the Data Gap Work Plan. MDNR has reviewed the Health and Safety Plan prepared by Solutia and found it to be largely adequate. In addition, Solutia requires all new contractors performing any kind of work at the Queeny facility to participate in a training course designed for site safety and emergency procedures. Contractors must pass an examination covering this material prior to being allowed on site.

For this CME Report, MDNR has evaluated the various elements comprising Solutia's groundwater documented groundwater sampling procedures with the aid of a worksheet. A copy of the completed worksheet is contained in Appendix G of this CME Report. Once Solutia has begun a regularly-sampled groundwater monitoring program, MDNR suggests that Solutia prepare a stand-alone, site-specific groundwater SAP that clearly outlines which wells are being sampled, at what frequency, and for the presence of which hazardous constituents. Solutia should incorporate all of the sampling-related elements currently contained in the Data Gap Work Plan, and make the following additions as noted on the SAP Worksheet:

- The SAP should describe what precautions are taken by sampling personnel to prevent purging and sampling equipment from contacting the ground surface. This is missing from the current procedural outline and as noted in the ESP Sampling

Audit Report, equipment was allowed to touch the ground during the split-sampling event.

- The SAP should contain a copy of the Chain-of Custody form to be completed by sampling personnel prior to shipping samples to the analytical laboratory.

- The SAP should state which order the sampling containers are filled in accordance with the volatilization potential. The ESP sampling audit noted that Solutia personnel do not follow EPA guidance on sampling order.

- The SAP should devote a section to descriptions of routine well maintenance inspections and appropriate follow-up repairs. The section should state that at least once a year the total well depth will be measured and compared with corresponding as-built well depths to determine the degree of well siltation and consequent screen occlusion. The SAP currently states that a 10% well screen occlusion is the criteria for well redevelopment, which is acceptable.

- Several items were included in the SAP but not executed during the split-sampling event. The SAP mentions duplicate samples but does not require duplicates or explain the protocol for obtaining duplicates. The SAP requires sampling equipment not to touch any contaminated surfaces, but some minor instances were observed during split sampling where equipment could be contaminated.

4.3 Field Sampling and Analysis Procedures

Mr. Larry Lehman of the MDNR-ESP audited Solutia's sampling event, including their procedures for well evacuation, groundwater sampling, sample preparation and packaging, and their completion of all pertinent sampling paperwork. Mr. Lehman has completed a worksheet covering all applicable categories of sampling, a copy of which is contained in Appendix H of this CME Report. The worksheet revealed the following issues regarding Solutia representatives' sampling practices:

- During the well purging process for well HW-1B, Solutia representatives allowed the black air hose that was used as part of the Dull Tube Air Lift Developer purging equipment to rest on the ground prior to its placement in the wellbore. This practice could introduce contamination from the ground surface into the groundwater being sampled and should be avoided in the future.

- The order of sample collection used by Solutia representatives needs to be modified. Per Missouri and EPA guidance for sample collection at RCRA sites, the preferred order for sample collection at Solutia would be: 1) Volatile Organic Constituents; 2) Semivolatile organics; 3) Metals; and 4) Major water quality ions. This order is consistent with what was described for sampling procedures in Solutia's approved Data Gap Work Plan. The ESP noted that VOCs were collected last during sampling of well GM-1.

- The ESP noted that Solutia representatives only collected trip blanks for the analyses of VOCs. Per MDNR's Standing Operating Procedures (MDNR FSS-001), trip blanks should be collected for the analyses of base neutral/acid extractables, pesticides, and PCBs when those parameters are included in the facility groundwater analyte program.

why?

4.4 Physical Well Integrity Inspection

Mr. Hollman of the MDNR-DGLS inspected the structural integrity of 27 groundwater monitoring wells at Solutia and completed a worksheet based upon his findings. Mr. Hollman also took photographs of each well at Solutia that accompanied the worksheet. The pictures are not attached to this CME Report but are contained in the HWP's Groundwater Monitoring file for Solutia. A copy of the well integrity worksheet is contained in Appendix I of this CME Report. The inspection revealed that many of the wells had significant problems with regard to overall integrity. The most serious issue is the lack of surface pads/seals for most of the monitoring wells. Lack of seals will allow potentially contaminated precipitation runoff, chemical spills, and/or fuels to be introduced into the annular space of the well and thereby contaminating the shallow groundwater down to the annular seal. The DGLS report cited the following major observations regarding well integrity at Solutia:

- Most of the wells do not have weep holes drilled at the base of the outer protective casing. The DGLS recommends such holes to promote drainage of accumulated water in the annulus. Water in the annulus can result in accelerated corrosion of stainless steel casings or freeze/thaw damage of PVC casings. DGLS noted that one well in particular, MW-11B, had two feet of water in the annulus.

- The following wells were noted to have surface pads in dire need of replacement or repair: MW-18B, MW-2R, OBW-2, MW-21R, and MW-14.

- The following wells had no surface pads and, thus, their integrity may be suspect since they have been open to the surface environment for at least five years: MW-8R, MW-2A, MW-2B, OBW-1, MW-4, VW-2, VW-1, HW-1, HW-1B, HW-2, HW-3, MW-11A, MW-11C, QS-1, MW-10, MW-9, and MW-19. Each of these wells must be evaluated by Solutia to see if they still are capable of yielding representative samples from their corresponding screened intervals given their exposure to the surface.

- Most of the wells lacked adequate collision protection (i.e., bumper posts) to protect against vehicular damage. Several of these wells were noted to be located in areas with semi-trailer traffic.

4.5 Downhole Measurement Audit

Mr. Hollman of the DGLS also audited Solutia personnel's downhole measurements of the potentiometric surface and total well depth. Mr. Hollman measured water levels and well depths in the following two wells to compare his measurements with those obtained by Solutia:

WELL	WATER DEPTH		WELL DEPTH	
	DGLS	SOLUTIA	DGLS	SOLUTIA
GM-1	9.30'	9.30'	13.35'	13.37'
MW-3	14.30'	14.25'	31.76'	31.90'

The DGLS reported that both series of depth measurements were in close agreement. Solutia's water level measurements averaged 0.025 feet shallower than the corresponding DGLS measurements and Solutia's total well depth measurements averaged 0.08 feet apart from the corresponding DGLS measurements. The DGLS concluded that Solutia field personnel are obtaining and recording accurate well depth measurements.

4.6 ESP/Solutia Split Sampling Results

On June 14th and 15th, 2000 as part of the O&M inspection, Mr. Lehman also split monitoring well samples with Solutia personnel. The sampling teams split groundwater samples from wells GM-1, MW-3, and MW-13. MDNR also took a trip blank to the facility and obtained a duplicate sample from well MW-13. Solutia personnel contacted MDNR the following week to notify the ESP that these three well samples were damaged during shipment to the analytical laboratory and were deemed lost. Mr. Lehman returned to the facility on June 29th, 2000 and obtained sample splits from wells HW-1B and MW-8A. A trip blank was also brought to the facility for subsequent analysis. All wells that were chosen for split-sampling had exhibited historical high levels of various classes of hazardous waste constituents.

Both parties used Solutia's equipment for obtaining the well samples. The ESP samples were preserved with hydrochloric acid (VOCs only) and then stored on ice for the trip back to Jefferson City to be analyzed by the state laboratory for VOCs via test method 8260, BNAs via test method 8270, and pesticides (sample GM-1 only) via test method 8080A. Solutia's samples were preserved, stored on ice, then transported overnight express mail to Savannah Laboratories and Environmental Services, Inc. in Savannah, Georgia. A complete printout of the ESP laboratory results is contained in

Appendix J of this CME Report, while Solutia's groundwater monitoring data are contained in Appendix K.

A comparison between the state's analytical laboratory results and the analytical results from Solutia's lab is provided in the table on the page 67 of this CME Report. The Table generally shows that the levels of hazardous constituents detected between the two parties are relatively close, with a few exceptions. In the sample from well GM-1, the ESP detected benzene, 1,2-DCA, 2-chlorophenol, bromobenzene, and 4-methylphenol at significant levels where the Solutia laboratory did not report any detections of these. It should be noted that the benzene, DCA, and chlorophenol detections were all at levels above federal drinking water standards. It is possible the very high presence of Chlorobenzene at 180,000 ppb detected by the Solutia laboratory provided problems in detecting the other aforementioned constituents at low levels. In the samples from wells MW-3 and MW-13, both parties detected the same five organic constituents (though they were a different set of 5 in each sample) at very close levels. The ESP detected two constituents from the well HW-1B sample that the Solutia lab did not. These included 1,1-DCA and 1,1-DCE at a level (14.6 ppb) exceeding the EPA MCL of 7 ppb. The other three constituents that both parties detected were in relatively close agreement for organic splits. In the sample from well MW-8A, the ESP detected four constituents (1,2-DCE, TCE, Vinyl Chloride, and Chlorotoluene) that the Solutia lab did not. However, all four of the ESP detections were well below corresponding EPA MCLs.

In evaluating the two parties' data, it does not appear that there is any concern regarding Solutia's analytical laboratory ability to analyze and report accurate groundwater data. However, it is imperative that Solutia's laboratory be capable of detecting hazardous constituents at least at levels approaching maximum published state and federal drinking water standards. Specifically, this will be important for analyses of groundwater samples obtained from wells at the downgradient edge of the contaminant plume's perimeter so an accurate determination can be made on the migration of hazardous constituents seen to pose a threat to human health and the environment.

The comparison of field measurements obtained by both parties reveals the specific conductance values and pH measurements were in relative close agreement, within $\pm$ 15% of one another. The temperature readings were also in close agreement, with the exception of the measurement taken from sample HW-1B. The parties' temperature readings were 3.7 degrees apart. Overall, it appears as though Solutia is making accurate field measurements during purging prior to obtaining well samples.

MDNR-ESP/SOLUTIA SPLIT SAMPLING RESULTS

June 14, 15, 29, 2000

	GM-1		MW-3		MW-13		HW-1B		MW-8A	
CONSTIT	ESP	SOL.	ESP	SOL.	ESP	SOL.	ESP	SOL	ESP	SOL
PH	6.32	6.18	7.29	6.61	7.57	7.16	7.31	6.79	7.0	6.53
Specific Cond.	1870	2090	7290	8090	NR	3690	1350	1560	1790	1730
Temp.	21	19.6	20	18.6	19	17.2	22	18.3	22	20.3
Chloro Benzene	209000	180000	168	85	2460	1400			4550	3400
Benzene	47.2	NR	<20	0.62	1110	720			19.6	16
1,2 DCE			466	400			1420	880	1.7	NR
1,2 DCA	145	NR								
PCE			392	310			31.4	38	82	61
TCE			183	160			852	590	3.3	NR
Vinyl Chloride			21.3	14					1.7	NR
1,1 DCA							17.1	NR		
1,2 DCB									4	4.6
1,1 DCE							14.6	NR		
Acenaph					6.3	3.9				
Naphthal									<5	26
2-Chloro phenol	48	NR							<10	23
1,4 DCB									6.0	5.6
Bis-phth					8.7	7.5			140	28
2-Chloro toluene									38.2	NR
Bromo Benzene	37.7	NR								
4-Methyl phenol	110	NR								
Chloro-Aniline					560	660			<10	2.3

- All hazardous constituents reported in ug/l, temperature in degrees Celsius, and specific conductance in umhos/cm.
- "NR" denotes facility did not report the detection limit or any results for that constituent.

5. CONCLUSIONS AND RECOMMENDATIONS

The evaluation of the Solutia Queeny facility in St. Louis, Missouri, which forms the basis of this CME Report, has identified several items of concern regarding the facility's operation and maintenance of its groundwater monitoring program, Sampling and Analysis Plan (SAP) content, adequacy of the site characterization and description, and the adequacy of the extent of groundwater contaminant plume determinations. The following conclusions briefly restate the findings of this evaluation of Solutia's groundwater monitoring program with respect to the requirements of EPA's HSWA Permit, EPA's NOD regarding site characterization from 1997, and the technical requirements found in the EPA's RCRA Groundwater Monitoring Compliance Order Guidance (COG) and the RCRA Technical Enforcement Guidance Document (TEGD). Both these EPA guidance documents outline in detail the groundwater monitoring requirements for RCRA hazardous waste management facilities. A detailed supporting discussion and/or rationale for these inadequacies is presented in the main body of this report. A brief summary of conclusions and potential actions designed to address the noted deficiencies are presented in the following text.

5.1 Sampling Issues

Solutia must develop a stand-alone groundwater Sampling and Analysis Plan (SAP) which contains all groundwater field sampling procedures, lists the wells to be sampled and at what frequency, the parameters to be analyzed for at each location, and describes all inspection and maintenance protocol at the facility. Solutia should modify its SAP to include procedures to prevent contamination of purging and sampling equipment, include a sample chain-of-custody form, include a section describing yearly well depth measurements and well screen siltation analysis, and sampling QA/QC procedures. DNR feels that the ideal time for Solutia to prepare and submit a new SAP is after the RFI has been completed and Solutia begins a regularly-sampled monitoring program.

The ESP groundwater sampling audit revealed several practices performed by Solutia personnel that need to be modified. These include sampling personnel altering their procedures such that purging and sampling equipment are not allowed to touch the ground, a practice which could lead to cross-contamination between the surface and wellbore. Solutia must collect trip blanks for all applicable analytes and follow EPA guidance on the order of sample collection based on volatility of the parameters. Solutia's analytical laboratory must be capable of attaining detection limits of each hazardous constituent that are at least less than or equal to published health-based groundwater protection standards.

5.2 Well Integrity Issues

The well integrity audit performed by DNR-DGLS revealed numerous problems with the condition of Solutia's groundwater monitoring wells. The most serious issue was the surface pad deterioration at many of the wells. Another issue included a lack of weep holes drilled at the base of the outer protective casing to help prevent corrosion and freeze/thaw damage. DGLS also recommends Solutia install collision prevention "bumper" posts around each monitoring well located in a vehicular traffic area.

Solutia must provide to DNR monitoring well completion diagrams for all new RFI wells completed in the summer of 2000. Any well that is abandoned should be done so in a manner consistent with rules contained in 10 CSR 23 – 4.080. Abandonment records should be copied and submitted to the Hazardous Waste Program along with groundwater monitoring data packages. Solutia must evaluate the condition of each monitoring well with subject integrity and propose to abandon any well that cannot reasonably yield a representative groundwater sample from its screened interval.

5.3 Site Characterization Issues

After the many phases of site investigation at the Queeny facility, Solutia has done an adequate job of defining the various alluvial units beneath the facility. This includes determinations of hydraulic conductivity, groundwater flow directions, flow gradients, flow velocities, and estimated extent of each alluvial unit. The upper bedrock has not been as extensively characterized as the alluvial unit, though Solutia has prepared and adequate top of the bedrock contour surface. No bedrock flow properties (including velocity calculations), other than apparent direction of flow provided on a potentiometric map, have been evaluated by Solutia. In its RFI report, Solutia should focus on an evaluation of the presence of preferential pathways within the saturated bedrock and the interconnection of bedrock with the Mississippi River.

The determinations of the horizontal extent of groundwater in the shallow and deeper saturated alluvial intervals is largely incomplete due to the inability of Solutia to sample groundwater at locations off-site. Off-site migration of contaminants has probably occurred at locations to the southeast, south, east, and northeast of the property boundary. As part of the Final RFI report or Corrective Measure Study Work Plan, Solutia must evaluate ways to determine the off-site impacts of the groundwater contamination originating from its SWMUs.

Solutia has determined that groundwater contaminants have migrated downward into the upper bedrock at the facility at levels significantly higher than published health-based groundwater standards. It has yet to be determined by Solutia whether there is substantial contaminant movement within the saturated upper bedrock interval, or if the contaminants are only primarily migrating downward and not laterally. Solutia has also not determined the presence of what could be considered as a lower confining unit, or an "aquitard," that would prevent further downward migration of dense contaminants. Solutia has calculated upward groundwater flow gradients, with flow tending to move from the upper bedrock into the lower alluvial sands. However, the lack of deeper bedrock sampling points under areas of confirmed, shallower contamination implies that the true vertical extent of groundwater contamination has not been defined. As mentioned numerous times in this CME Report, Solutia must evaluate potential contaminant movement within the upper bedrock as part of its Final RFI Report.

As an appendix to the Final RFI Report, Solutia should attach all of the raw, uninterpreted groundwater monitoring data from the summer 2000 site investigation. This data should include all laboratory QA/QC and each constituent that was analyzed for, including the non-detect constituents with their corresponding detection limits. Evaluation of Solutia's contaminant extent interpretations cannot be made by DNR or EPA without full knowledge of all detections and non-detections.

Most of the issues raised throughout this CME report can be addressed by Solutia as part of the Final RFI Report preparation. DNR expects the Sampling and Analysis Plan, field sampling procedures, and well integrity issues to be addressed separately as appropriate.

6. REFERENCES

Solutia, October 1998, RCRA Facility Investigation Data Gap Work Plan, John F. Queeny Plant, prepared by O'Brien and Gere Engineers, Inc.

Solutia, December 8, 2000, RFI Data Gap Investigation, prepared by URS Corp.

Solutia, March 1998, RCRA Corrective Action Only Part B Permit Application.

Missouri Department of Natural Resources, March 1995, Missouri Well Construction Rules, Division of Geology and Land Survey.

Missouri Department of Natural Resources - Hazardous Waste Management Program; 1987 - present, Open file correspondence in RCRA Hazardous Waste Enforcement, Treatment/Storage/Disposal, and Groundwater Monitoring Files.

Office of the Federal Register National Archives and Records Administration, 1998, Code of Federal Regulations, Chapter 40, Parts 190-299, 1027 p.

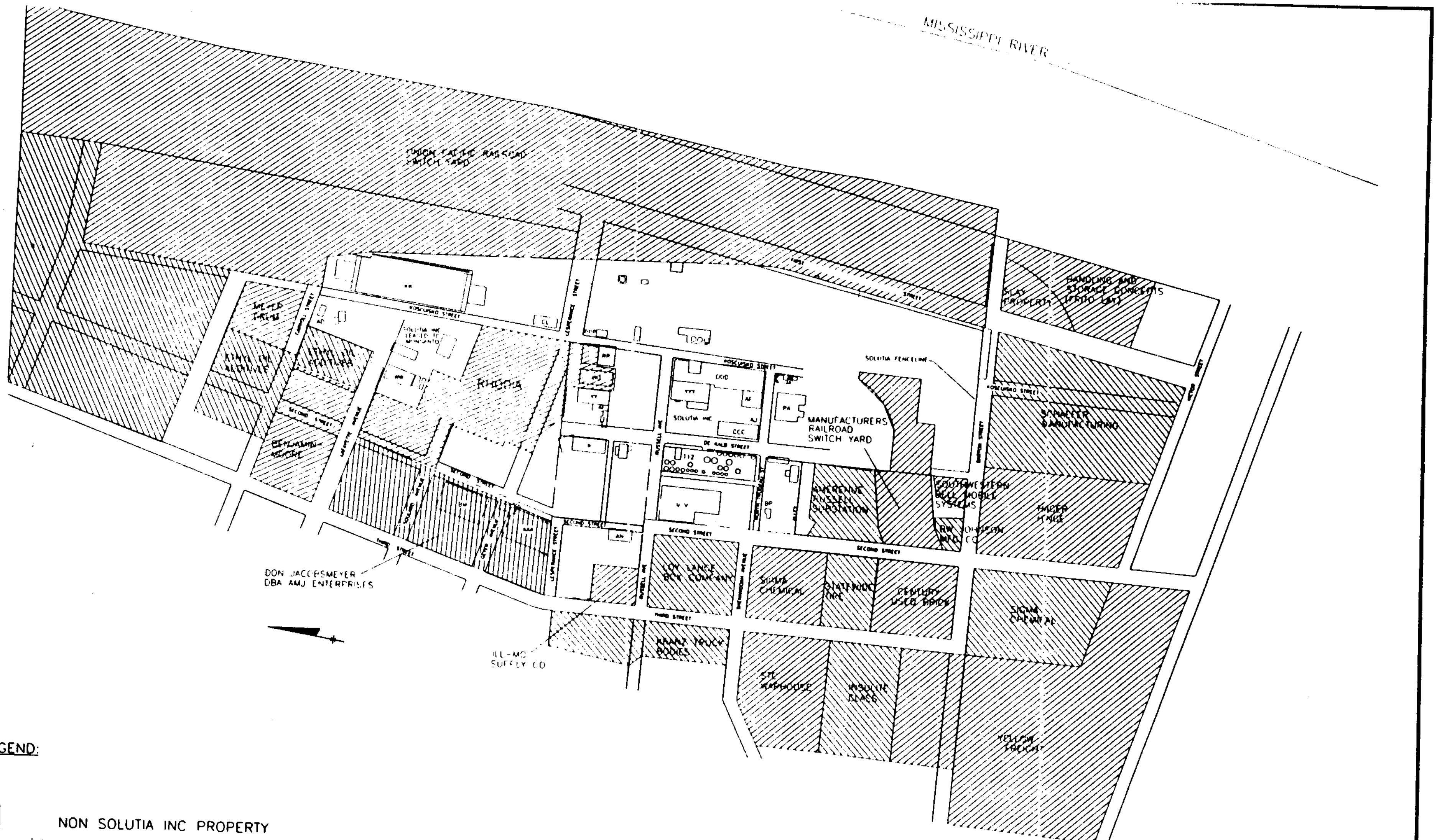
United States Environmental Protection Agency (USEPA), 1989a, EPA Groundwater Handbook, Office of Research and Development, 212 p.

United States Environmental Protection Agency (USEPA), 1986a, RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD), Office of Solid Waste and Emergency Response, 208 p., appendices.

United States Environmental Protection Agency (USEPA), 1985, RCRA Groundwater Monitoring Compliance Order Guidance, Office of Solid Waste and Emergency Response, 97 p., appendices.

Appendix A

Site Maps

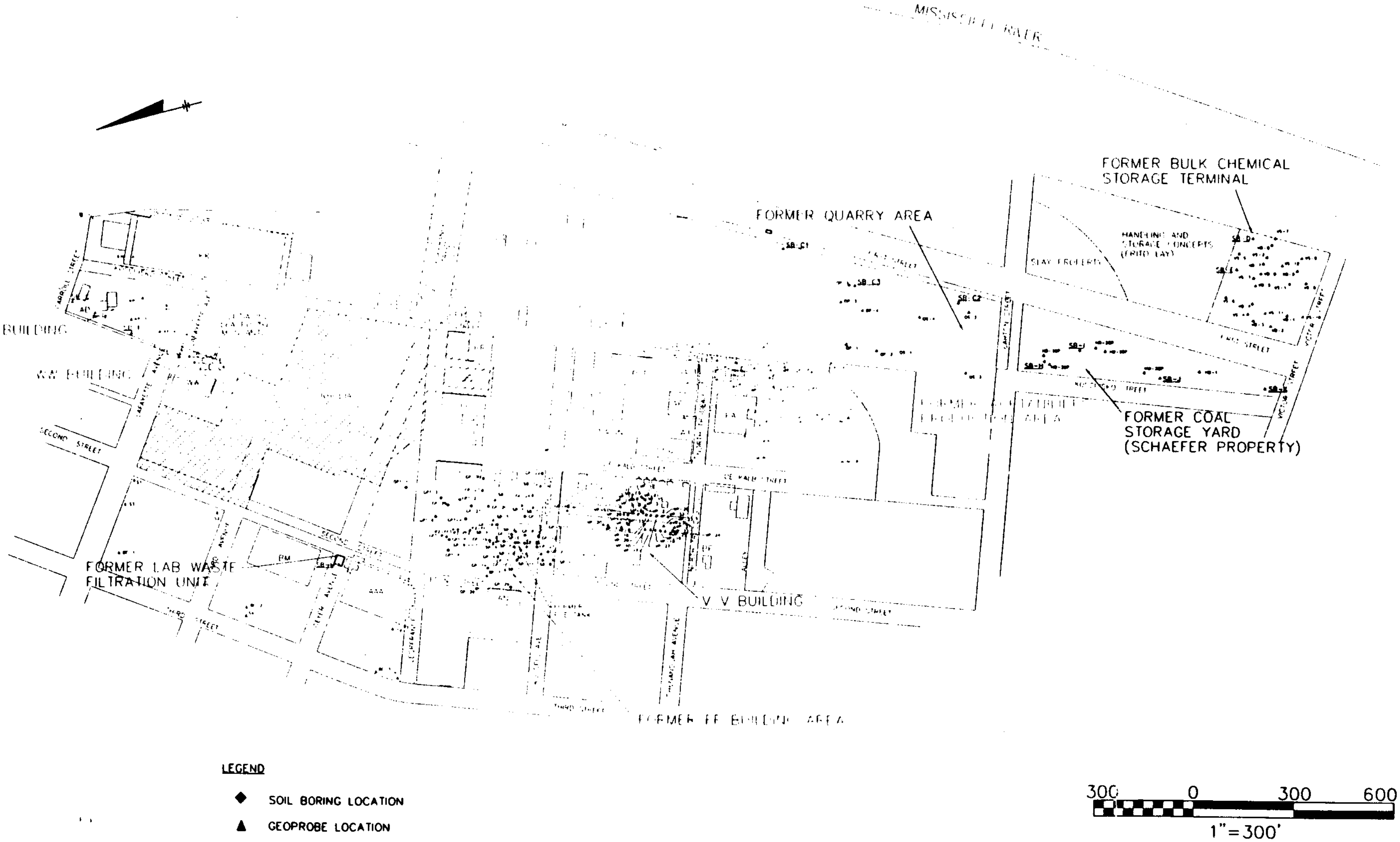


LEGEND:

NON SOLUTIA INC PROPERTY

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjk CHKD. BY:	John F. Queeny Surrounding Properties
FIG. NO.	2



LEGEND

◆ SOIL BORING LOCATION

▲ GEOPROBE LOCATION

SOIL SAMPLING POINT OF THE RFI DATA GAP INVESTIGATION

NOTES:

1. SAMPLING POINTS WITHIN A SWMU OR AREA OF CONCERN ARE SHOWN AS THE SAME COLOR.
2. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN BY: tjc CHKD. BY:	SWMU & AOC Locations — FIG. NO. 1

FIGURE 1

CAHOKIA QUADRANGLE

STATE LOCATION MAP

SOLUTIA, INC.
JOHN F. QUEENY PLANT
ST. LOUIS, MISSOURI

TOPOGRAPHIC SITE LOCATION MAP

2600.036.013
8/14/98

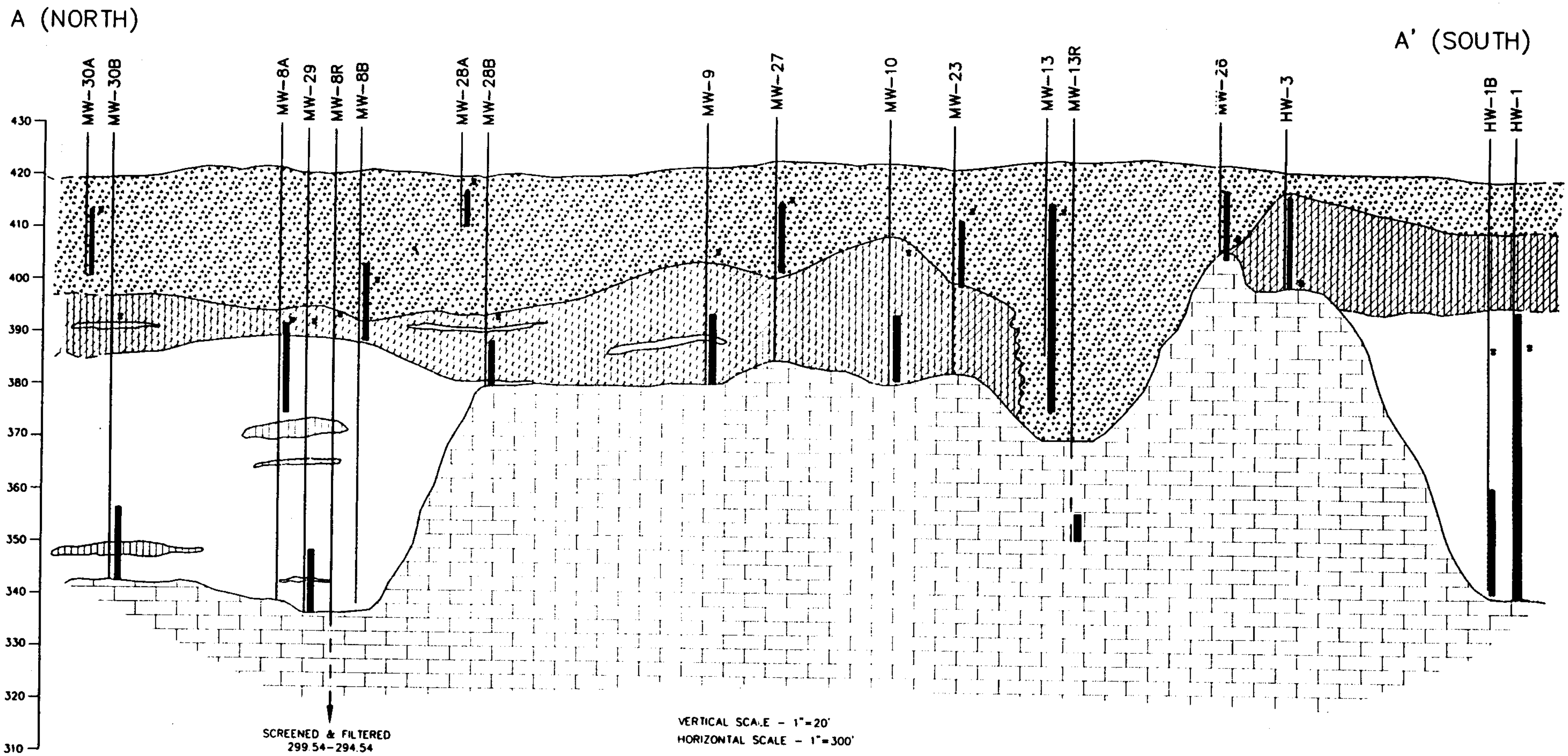
O'BRIEN & GERE ENGINEERS INC.

DWG PATH: I:\PROJE..S\2600\2600036\DWG

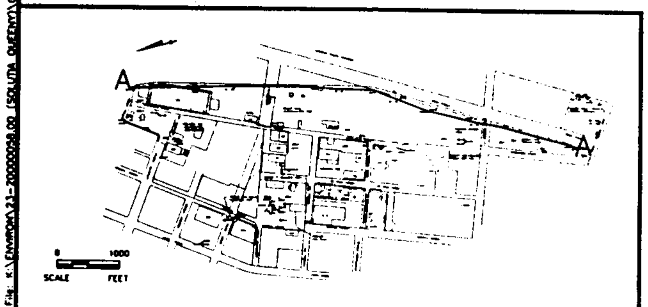
PLOT DATE: 8/14/98

Appendix B

Site Geologic Maps



VERTICAL SCALE - 1"=20'
HORIZONTAL SCALE - 1"=300'

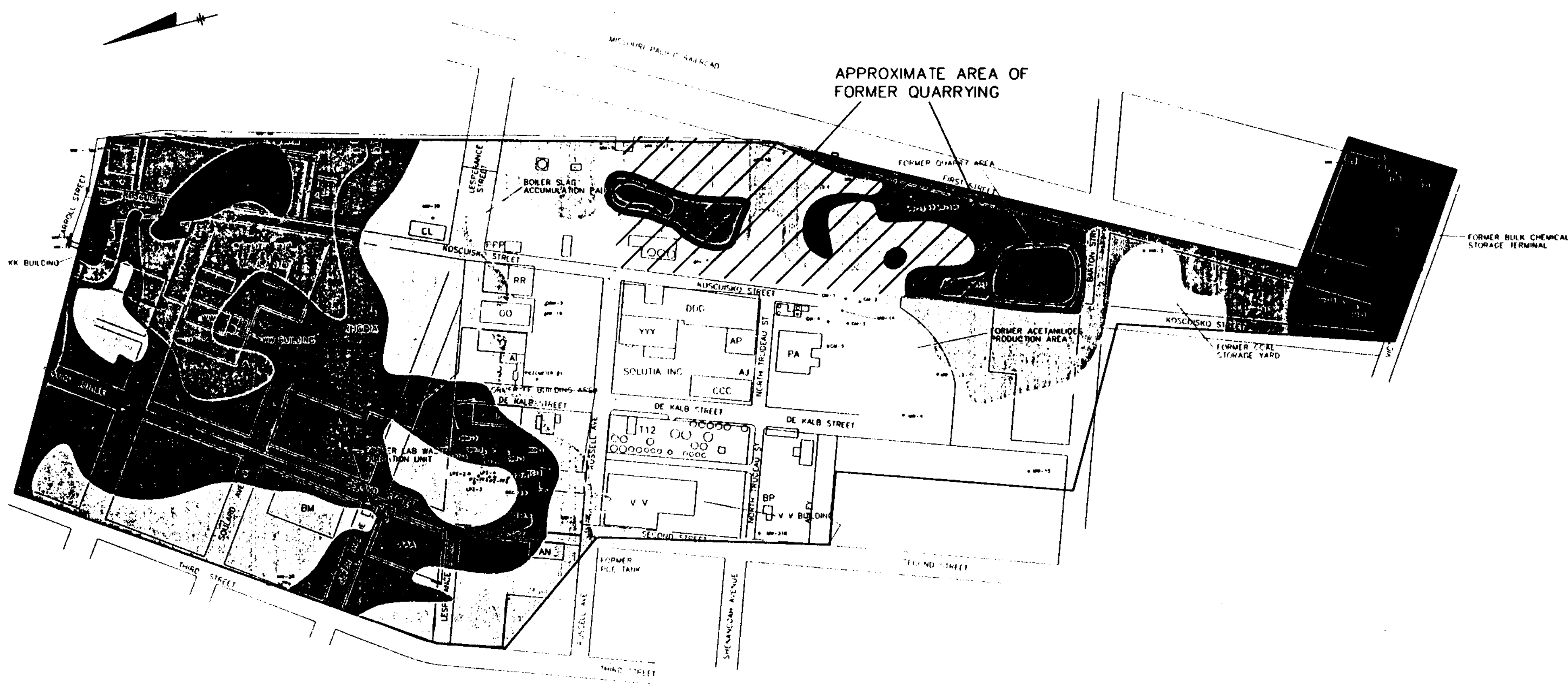


LEGEND

- FILL (CLAY, SILTS, GRAVEL, BRICK)
- GROUNDWATER ELEVATION (AS MEASURED ON AUGUST 1 & 2, 2000)
- SCREENED INTERVAL
- FILTER PACK INTERVAL
- MW-30A MONITORING WELL IDENTIFICATION

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Subsurface Profile
FIG. NO.	14



LEGEND

GROUND WATER MONITORING WELLS AND PIEZOMETERS

BEDROCK ELEVATION

GREATER THAN 400

380 TO 400

360 TO 380

340 TO 360

LESS THAN 340

300 0 300 600

1"=300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN (FIGURE 5) JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Top of Bedrock Contour Map — FIG. NO. 15

Appendix C

Potentiometric Maps

Table 5. *Ground water elevation comparison.*

Location	10/7/97	11/4/97	12/2/97	1/6/98	2/3/98	3/3/98	4/7/98	5/5/98	6/2/98	7/7/98	8/4/98	9/1/98
MR@R*	386.12	388.87	388.62	390.36	391.54	396.32	411.18	405.08	395.09	406.19	395.33	390.39
GM1	416.05	416.02	415.92	415.92	415.60	415.95	416.24	416.30	416.37	416.67	416.57	416.41
GM2	415.59	415.69	415.69	415.91	415.63	416.07	416.33	416.45	416.33	416.16	416.55	416.36
GM3	420.29	419.95	419.87	420.44	420.00	420.28	420.70	420.71	420.72	418.39	420.57	420.25
HW1	387.12	388.21	388.24	388.78	387.53	396.38	410.63	405.86	395.78	406.12	396.77	385.13
HW1B	386.96	388.17	388.36	389.07	387.45	396.33	410.67	405.76	395.75	406.06	396.99	385.14
HW2	396.66	396.71	396.55	396.39	396.78	399.07	408.15	408.36	403.02	408.33	404.88	400.11
HW3	400.12	399.99	400.11	DRY	DRY	DRY	410.75	408.01	400.86	408.15	403.30	400.16
LPZ1	411.80	411.37	411.32	411.28	412.35	412.60	414.32	414.38	414.54	414.73	414.73	414.37
LPZ2	411.17	411.61	411.33	411.71	411.68	412.74	414.09	414.11	413.45	414.12	415.17	412.83
LPZ3	410.26	410.32	410.16	410.42	409.72	411.88	413.48	413.58	413.47	415.08	413.82	412.75
LPZ4	411.11	NM	404.89	404.53	403.49	412.01	406.76	NM	407.08	408.92	405.06	403.89
LPZ5	----	411.25	411.11	411.24	412.24	412.64	414.31	414.21	414.72	415.66	415.39	414.46
MW1A	408.73	408.78	408.50	407.03	407.70	408.85	413.30	412.51	411.32	412.25	411.44	409.19
MW1B	410.20	410.22	410.20	410.35	410.40	413.95	413.68	413.10	411.83	413.99	413.00	411.70
MW2A	410.88	409.68	410.84	409.04	409.29	410.36	413.16	413.02	411.79	413.29	412.54	410.77
MW2B	412.20	412.74	412.44	413.05	413.15	414.36	417.74	417.38	415.75	417.80	416.85	414.98
MW2R	414.75	415.12	414.95	415.29	415.22	415.95	417.89	417.69	416.69	417.84	417.31	416.25
MW3	410.75	410.98	410.82	411.06	411.11	412.14	414.96	414.97	413.61	415.19	414.40	412.90
MW4	417.53	418.18	418.11	418.55	418.21	418.64	419.76	419.54	418.96	420.16	419.79	418.83
MW5	414.52	414.44	414.42	414.53	414.71	414.83	415.72	415.25	415.00	415.56	415.30	415.06
MW7B	391.71	392.15	391.32	391.24	391.42	397.17	408.89	409.75	400.22	407.58	402.15	395.00
MW8A	390.11	----	390.43	390.68	390.29	396.66	409.93	407.38	398.94	407.29	401.57	393.04
MW8B	399.39	399.59	398.79	398.98	399.15	402.89	412.48	410.83	405.92	411.23	400.65	401.98
MW8R	391.35	392.60	391.53	391.44	391.47	397.66	408.50	407.84	400.60	407.45	407.01	387.10
MW9	403.18	403.70	403.32	403.46	403.50	406.43	412.18	411.32	407.82	411.39	408.61	404.72
MW10	399.67	399.76	402.01	400.22	400.43	402.79	406.35	405.56	402.75	405.95	403.84	401.69
MW11A	412.09	411.96	411.99	412.17	412.52	412.81	413.88	413.76	413.30	413.88	414.60	413.16
MW11B	412.14	411.88	411.90	412.13	412.21	411.91	412.42	412.74	413.14	413.48	413.28	412.51
MW11C	412.23	411.80	412.11	412.13	413.06	412.64	413.91	414.04	413.22	413.73	413.63	413.05
MW13	412.09	411.99	411.99	412.18	412.52	412.90	413.88	414.38	413.64	414.05	413.63	413.23
MW13R	411.14	411.08	411.18	411.01	411.54	411.96	413.27	413.93	412.82	413.60	412.93	412.38

Table 5. *Ground water elevation comparison (continued).*

Location	10/7/97	11/4/97	12/2/97	1/6/98	2/3/98	3/3/98	4/7/98	5/5/98	6/2/98	7/7/98	8/4/98	9/1/98
MW14	419.67	419.24	419.61	418.93	419.17	418.88	419.26	419.38	419.68	419.72	419.43	419.49
MW15	412.55	412.53	412.49	412.70	412.63	412.78	413.31	412.99	412.74	413.35	413.36	412.74
MW17	404.54	404.78	404.44	403.50	404.10	405.97	413.88	410.85	408.90	411.03	410.58	406.74
MW18A	391.16	391.81	391.16	390.90	390.63	397.34	409.35	407.45	399.29	406.95	401.34	393.99
MW18B	411.81	411.87	412.09	412.71	413.71	412.38	413.14	413.37	412.76	413.31	412.95	412.51
MW19	413.14	413.01	413.43	412.86	412.83	412.78	412.83	412.93	412.74	412.90	411.81	412.66
MW20	412.95	412.07	412.68	412.78	413.17	413.46	415.21	415.08	415.51	415.48	415.17	414.55
MW21R	416.32	416.30	416.68	416.56	416.35	416.56	416.95	416.53	416.37	416.86	416.48	416.36
OBS1	391.26	392.00	391.17	391.22	391.24	397.31	409.34	408.19	399.94	407.66	401.79	394.21
OBW1	410.45	408.48	409.61	409.76	410.03	411.14	414.33	414.48	413.01	414.58	413.63	411.96
OBW2	409.80	409.38	409.44	409.15	409.66	409.93	412.41	413.81	413.05	413.56	406.44	412.46
OBW3	410.96	410.96	411.02	411.03	411.17	411.23	411.41	411.62	411.70	411.87	411.97	412.00
QS1	412.07	411.95	411.97	412.18	412.50	412.80	413.88	413.67	413.35	413.93	413.62	413.17
TW1	390.50	391.28	390.55	390.74	390.56	397.05	409.61	407.51	399.27	407.32	400.92	393.26
VW1	408.65	408.53	408.44	408.33	408.44	408.51	408.86	409.22	409.23	409.56	409.66	409.55
VW2	408.16	408.06	407.89	408.33	408.36	408.56	409.83	409.27	409.15	409.23	409.67	409.02
VW2B	386.66	389.11	388.41	389.67	387.21	396.25	410.74	405.55	395.55	405.61	395.58	387.11

*Mississippi River @ Russell Boulevard

---- -

NM - not measured

Source: O'Brien & Gere Engineers, Inc.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG Shallow Bedrock Well	REPORT OF BORING OBW-1
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 1 of 4 Location: W of II Bldg. Start Date: 07/12/94 End Date: 07/26/94
Boring Company: United GeoScience Foreman: Chuck Caltry OBG Geologist: LS Douglas		Screen / Riser / Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
0						2" Asphalt				
						Black, silty clay w/chemical odor				
1										
2										
3										
4										
5										
						Same as above				
6										
7										
8										
9										
10										
						Brown, silty clay				
11										
12										
13										
14										
15										
16										
17						Saturated zone - 17'				
						Soft, brown, silty clay				
18										
19										
20										
21										
22						Soft, gray, silty clay - 22'				
23										

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG Shallow Bedrock Well	REPORT OF BORING OBW-1
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 2 of 4 Location: W of II Bldg. Start Date: 07/12/94 End Date: 07/26/94
Boring Company: United GeoScience Foreman: Chuck Caltry OBG Geologist: LS Douglas		Screen = Riser / Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
24										
25										
						Same as above				
26										
27										
28										
29										
30										
						Same as above				
31										
32										
33										
34										
35										
						Same as above				
36										
37										
38										
39						Harder layer - 39'-45'				
40										
41										
42						Increasing sand/gravel content				
43										
44						Soupy; no consolidation				
45										
						Same as above				
46										
47										

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG Shallow Bedrock Well	REPORT OF BORING OBW-1
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 3 of 4 Location: W of II Bldg. Start Date: 07/12/94 End Date: 07/26/94
Boring Company: United GeoScience Foreman: Chuck Caltry OBG Geologist: LS Douglas		Screen Riser / Grout, Sand Pack, Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing HNu
48									
49									
50									
						Same as above			
51									
52						Approx. 6" limestone shelf - 52'			
53									
54									
55									
56									
57									
						Auger refusal - 58'			
58	1	58-64.3'		6.3'/4.3'		Cored 58' to 64.3' (6.3' penetration)			
						Recovered 4.3' (gray limestone)			
59						58'-60' Weathered, broken			
						limestone w/shale/clay interbedded			
60						(unconsolidated)			
						60'-64.3' More competent limestone			
61						(3" to 6" sections) w/interbedded			
						shale/clay layers (unconsolidated)			
62						Some concreted fracturing			
						Sections greater than 10 cm-12 cm			
63						(1 section)			
						64'4"			
64	2	64.3'-	68'2"	3'10"/2.0'		3" to 4" sections of gray limestone			
						weathered w/shale/clay interbedded			
65						no 10cm sections			
66									
67									
68						68'2"			
	3	68'2" -	78'2"	10'/9'3"		69'8" - 70'.0" - void			
69									
70									
71									

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG Shallow Bedrock Well	REPORT OF BORING OBW-1
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 4 of 4 Location: W of II Bldg. Start Date: 07/12/94 End Date: 07/26/94
Boring Company: United GeoScience Foreman: Chuck Caltry OBG Geologist: LS Douglas		Screen / Riser — Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
72										
73										
74										
75										
76										
77										
78	4	78'2" -	83'2"							
				5/5'		78'2"				
79										
80										
81										
82										
83						End of coring - 83'2"				
84										
85										
86										
87										
88										
89										
90										
91										
92										
93										
94										
95										

68' to 78' bgs --> Screen. Sand to 63' to 78' bgs. Bentonite to 63' to 57' bgs. Grout to surface with above grade construction.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG Deep Bedrock Well	REPORT OF BORING OBW-2
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 1 of 4 Location: W of II Bldg. Start Date: 09/27/94 End Date: 10/05/94
Boring Company: Burlington Foreman: Kevin O'Brien OBG Geologist: LS Douglas		Screen = Riser Grout Sand Pack Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
0						Gravel/rubble surface				
1										
2										
3										
4										
5										
6										
7						Very stiff, dark grey, silty clay chemical odors throughout				
8										
9										
10										
11										
12										
13										
14										
15										
16										
17						Saturated zone				
18										
19										
20										
21										
22										
23										

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG Deep Bedrock Well	REPORT OF BORING OBW-2
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 2 of 4 Location: W of II Bldg. Start Date: 09/27/94 End Date: 10/05/94
Boring Company: Burlington Foreman: Kevin O'Brine OBG Geologist: LS Douglas		Screen = Riser \ Grout Sand Pack Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
24										
25										
26										
27										
28										
29										
30										
31										
32						Unconsolidated				
						wet silty clay				
33										
34										
35										
36										
37										
38										
39										
40						Weathered limestone				
						Gravel intermixed with wet,				
41						sloppy, high silt, silty clay				
42										
43										
						43.5' - Weathered limestone shelf				
44										
45										
46										
47										

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG Deep Bedrock Well	REPORT OF BORING OBW-2
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 3 of 4 Location: W of II Bldg. Start Date: 09/27/94 End Date: 10/05/94
Boring Company: Burlington Foreman: Kevin O'Brien OBG Geologist: LS Douglas		Screen / Riser / Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
48										
						Weathered limestone				
49										
50										
51										
52										
53										
54										
55										
56										
						Auger refusal - 56.2'				
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
						66.5' to 69' very soft layer very weathered limestone or shale with sand				
67										
68										
69										
70							70'-71' soft brown shale				
71										
						71.5' bottom of casing				

Cement-bentonite (5%) grout from 42' to 74' bgs (quick curing). Bentonite-enviroplug grout from 10' to 42' bgs.
Cement-bentonite (5%) grout from 10' to grade bgs.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG Deep Bedrock Well	REPORT OF BORING OBW-2
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 4 of 4 Location: W of II Bldg. Start Date: 09/27/94 End Date: 10/05/94
Boring Company: Burlington Foreman: Kevin O'Brien OBG Geologist: LS Douglas		Screen = Grout \ Riser Sand Pack Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
71						Top of casing 71.5'				
	1	71.5' -	80.5'	9.00'/8.95'			L.S.			
72						72' Shale seam interbedded in L.S.	L.S.			
						72.3' Same as above				
73						73'-77' Very competent L.S.				
74										
75							RQD = 82%			
76										
77						77'-79' Very competent L.S. with				
						interbedded vertical crystal				
78						structures				
79						79' Small shale seam				
						79.5'-80.5' Competent L.S.				
80							80'			
	2	80.5' -	90.5'	10.0'/10.0'						
81						80.5'-81' Competent L.S.	L.S.			
						81' Small shale seam				
82						81'-84' Heavily fractured L.S. -				
						crystalline lined vertical fractures				
83										
							RQD-98%			
84						84'-85.3' Competent L.S.				
						85.3' Small shale seam	84.5'			
85						85.3'-87' Competent L.S.				
							85.5'			
86										
87						87'-87.5' L.S. w/unlined vertical				
						fracture				
88						87.5'-88' Competent L.S.				
						88'-89' L.S. w/unlined vertical				
89						fractures				
						89'-90.5' Competent L.S.				
90										
	3	90.5' -	95.5'	5.0'/5.35'		90.5'-92' Semi-competent L.S.	L.S.			
91										
92						92'-92.3' Major soft shale seam				
						93' Small shale seam				
93						93'-94' Competent L.S.	RQD = 89%			
						94'-94.3' Major soft shale seam				
94						94.3'-95.5' Competent L.S.				
95						95.5' End of Coring				
						TD 96'				

Well construction: screen 86' to 96' bgs; sand 84.5' to 97' bgs; bentonite seal 79' to 84.5' bgs & hydrated; grout to surface.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING OBW-3
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 1 of 3 Location: E of MW-19 Start Date: 01/30/95 End Date: 02/2/95
Boring Company: Layne Western Foreman: Mike Vogt OBG Geologist: LS Douglas		Screen, Riser, Grout, Sand Pack, Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
						Fill				
3						Silty clay overburden				
6										
9										
12										
						Top of rock - 14'				
15						15.5'-16.5' Weathered limestone				
18										
21										
24										
						25' Competent gray limestone				
27										
30										
						32' Soft competent limestone				
33										
						35'-37' Soft limestone				
36										
39										
						40' Competent gray limestone				
42						41'-43' Soft limestone				
45						45' Dark gray competent limestone				
48										
						50' Dark gray competent limestone				
51										
54						54' 1" dark gray-blue shale stringer				
57										
						59'-60' Dark gray-blue shale				
60										
63										
66						66' Buff colored competent limestone				
						67.5' Fractured limestone				
69						70' Buff colored competent limestone				
						Begin core runs at 70'				

Steel casing set at 70' bgs

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING OBW-3
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 2 of 3 Location: E of MW-19 Start Date: 01/30/95 End Date: 02/2/95
Boring Company: Layne Western Foreman: Mike Vogt OBG Geologist: LS Douglas		Screen ≡ / Riser ☐ — \ Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
70	1	78'-78'		57% RQD		70'-71.5' Rough, coarse, gray and gray-blue limestone w/stylolites and gray shale stringers				
71						71.5'-73.5' Light gray limestone, competent w/healed vertical fractures				
72										
73						73.5'-76' Gray limestone w/intermixed shale stringers and some minor vertical cracks				
74										
75										
76						76'-78' Competent gray limestone w/stylolite at 78'				
77										
78	2	78'-88.5'		98% RQD		78'-83' Competent gray limestone w/stylolites at 78', 80', and 83'				-
79										
80										
81										
82										
83						83'-86' Competent gray limestone w/stylolites at 83' and 85'				
84										
85						85.5'-86.5' Gray limestone intermixed w/shale stringers				

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING OBW-3
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger Air rotary/hammer Hammer: Fall:	Page 3 of 3 Location: E of MW-19 Start Date: 01/30/95 End Date: 02/2/95
Boring Company: Layne Western Foreman: Mike Vogt OBG Geologist: LS Douglas		Screen / Riser / Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
86						86.5'-88.5' Competent dark gray limestone w/stylolites at 87.5' and 88'				
87										
88										
	3	88.5' -	98'	85% RQD		88.5'-92.5' Dark buff-gray competent limestone w/minor shale stringers; stylolites at 89'				
89										
90										
91										
92										
						92.5'-94.' Gray competent limestone				
93										
94										
						94.5'-96.5' Competent gray limestone intermixed w/heavy amount of shale stringers				
95										
96										
						96.5'-98' Dark buff-gray competent limestone				
97										
98										
						E.O.B. 98'				
99										
100										
101										

T.D. 98' bgs. Screen 83'-98' bgs. Sand - 98' bgs. Bentonite grout to surface w/above grade construction.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING LPZ-1
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger ATV Hammer: Fall:	Page 1 of 1 Location: Eastern most LPZ Start Date: 02/13/95 End Date: 02/13/95
Boring Company: Layne Western Foreman: Bill Ackerman OBG Geologist: LS Douglas		Screen = / Riser / Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
0										
1										
2										
3										
4										
5	1	5-7	3	2.0/1.8		Very stiff, dark brown, homogeneous,				1.0
			3			silty clay; moist to dry				
6			7							
			8							
7										
8										
9										
10	2	10-12	2	2.0/2.0		Soft, dark brown, homogeneous,				300
			3			silty clay; very moist				
11			3							
			3							
12										
13						Lab and Geotech sample				
14										
15	3	15-17	1	2.0/1.5		Soft brown & orange-brown silty				1000
			1			clay; heavy toluene odor;				
16			2			saturated w/sheen				
			2							
17										
18										
19										
20	4	20-22	1	2.0/1.5		Soft, high silt content, silty clay				500
			1			w/trace sand; saturated; brown				
21			2							
			3							
22										
23										
24										
25	5	25-27	0	2.0/1.2		Soft, gray-brown, sandy silt w/clay				500
			2			banded in variegated colored layers;				
27			3			saturated				
			4			E.O.B. 25'				

T.D. 25' bgs. Screen 10' to 25' bgs. Natural sand pack 19' to 25' bgs. Silica sand pack 19' to 8' bgs. Bentonite 8' to 6' pellets. Grout to surface.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING LPZ-2
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger ATV Hammer: Fall:	Page 1 of 1 Location: Northern most LPZ Start Date: 02/14/95 End Date: 02/14/95
Boring Company: Layne Western Foreman: Bill Ackerman OBG Geologist: LS Douglas		Screen / Riser / Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
0										
1										
2										
3										
4										
5	1	5-7	5	2.0/.08		Gravel w/silty clay; black-brown;				50
			5			moist				
6			5							
			50			Obstruction at bottom of spoon				
7										
8										
9										
10	2	10-12	3	2.0/1.8		Black, slimy, silty clay; moist				500
			4			Environmental lab sample and				
11			4			geotech sample				
			4							
12										
13										
14										
15	3	15-17	1	2.0/2.0		Saturated, black, slimy, silty clay;				500
			2			heavy toluene odor; very soft;				
16			1			saturated				
			3							
17										
18										
19										
20	4	20-22	0	2.0/2.0		Black-gray, very soft, clayey silt				500
			2			w/ trace fine sand				
21			3							
			5							
22										
23						E.O.B. 23'				
24										
25										
27										

T.D. 23' bgs. Screen 8' to 23' bgs. Sand 6' to 23' bgs. Bentonite pellets 4' to 6'. Grout to surface.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	REPORT OF BORING LPZ-3
Client: Monsanto Proj. Loc: Queeny Plant File No.: 2600.025	Sampler: Hollow stem auger ATV Hammer: Fall:	Page 1 of 1 Location: Start Date: 02/14/95 End Date: 02/14/95
Boring Company: Layne Western Foreman: Bill Ackerman OBG Geologist: LS Douglas		Screen, Riser, Grout, Sand Pack, Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
0						Gravel and bricks				
1										
2										
3										
4										
5	1	5-7	3	2.0/0.2		Dark brown, silty clay; moist; stiff;				0
			4			rocks; no odors				
6			5							
			8							
7										
8										
9										
10	2	10-12	3	2.0/1.8		Stiff, dark gray, homogeneous,				5
			4			silty clay; moist				
11			4			Environmental lab sample				
			6							
12										
13										
14										
15	3	15-17	3	2.0/2.0		Black, soft, silty clay; slimy;				200
			3			saturated; chemical odor (not toluene)				
16			4							
			6							
17										
18										
19										
20	4	20-22	1	2.0/1.5		Black, slimy, very soft,				NT
			1			unconsolidated, clayey silt				
21			2			Geotechnical sample				
			4							
22										
23										
						E.O.B. 23'				
24										
25										
27										

T.D. 23' bgs. Screen 8' to 23' bgs. Sand 5.5' to 23' bgs. Bentonite pellets 3.5' to 5.5'. Grout to surface.

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

REPORT OF BORING LPZ-4

Client: Monsanto

Proj. Loc: Queeny Plant

File No.: 2600.025

Sampler: Hollow stem auger ATV

Hammer:

Fall:

Page 1 of 1

Location: Southern most LPZ

Start Date: 02/14/95

End Date: 02/14/95

Boring Company: Layne Western

Foreman: Bill Ackerman

OBG Geologist: LS Douglas

Screen / Riser / Grout / Sand Pack / Bentonite

Depth Below Grade	No.	Depth (feet)	Blows /6"	Penetr/ Recovery	"N" Value	Sample Description	Stratum Change General Descript	Equip. Installed	Field Testing	HNu
0						Gravel and rubble throughout				
1										
2										
3										
4										
5	1	5-7	2	2.0/1.5		Stiff, dark gray, silty clay; saturated				0
			5			w/bitter odor; sheen on water				
6			5							
			8							
7										
8										
9										
10	2	10-12	4	2.0/2.0		Very stiff, dark gray, black, & gray-				0
			7			green faint mottling, silty clay;				
11			7			saturated zone				
			8			Environmental sample				
12										
13										
14										
15	3	15-17	2	2.0/2.0		Same as above; higher silt content				NT
			2			and softer				
16			3			Free phase on water; heavy toluene				
			3			odor				
17						Geotech sample				
18										
19										
20	4	20-22	0	2.0/1.5		Very soft, green-brown, sandy silt				
			1			w/clay; heavy toluene odor; minor				
21			2			sheens on water noted; no free				
			1			phase noted				
22										
23										
						E.O.B. 23'				
24										
25										
27										

T.D. 23' bgs. Screen 8' to 23' bgs. Sand 6' to 23' bgs. Bentonite pellets 4' to 6'. Grout to surface.

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	NUMBER: SB-7 SHEET 1 of 1
CLIENT: Monsanto Company PROJECT LOCATION: Monsanto Queeny Plant	GROUND WATER DATE DEPTH ELEVATION	FILE No.: 2600.024 DRILLING METHOD: SAMPLER TYPE: 2-1/4" HSA Split Spoon HAMMER: FALL:
O'BRIEN & GERE GEOLOGIST: LS Douglas BORING CO.: Layne Western FOREMAN: Johnson/Carpenter	BORING LOCATION: GROUND ELEVATION: DATES: STARTED: 09/02/93	RIG: TOC: ENDED: 09/02/93

DEPTH	Sample No.	Sample Depth	Sample Blows /6"	Sample Penetration/ Recovery	SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	LITHOLOGY	EQUIPMENT INSTALLED	HNU
1					4" of asphalt pavement Gravel fill to 2'				
2	1	2'-4'	5/5/6/7	2/1.5	Dark brown, dry, stiff silty clay Lab sample				1/2
3									
4	2	4'-6'	2/4/5/8	2/1.5	Dark brown, moist, stiff silty clay				1/2
5									
6	3	6'-8'	2/3/6/7	2/2	Same as above, increasing moisture Lab sample				1
7									
8	4	8'-10'	2/4/8/8	2/2	Brown silty clay, outside of spoon wet, increasing moisture				1
9									
10	5	10'-12'	2/2/3/4		Brown silty clay				1
11									
12					Saturated zone				
					E.O.B. - 12'				
13									
14									
15									

NOTES:

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	NUMBER: SB-8 SHEET 1 of 1
CLIENT: Monsanto Company PROJECT LOCATION: Monsanto Queeny Plant	GROUND WATER DATE DEPTH ELEVATION	FILE No.: 2600.024 DRILLING METHOD: SAMPLER TYPE: 2-1/4" HSA Split Spoon HAMMER: FALL:
O'BRIEN & GERE GEOLOGIST: LS Douglas BORING CO.: Layne Western FOREMAN:	BORING LOCATION: GROUND ELEVATION: DATES: STARTED: 09/03/93	RIG: TOC: ENDED: 09/03/93

DEPTH	Sample No.	Sample Depth	Blows /6"	Penetration/ Recovery	SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	LITHOLOGY	EQUIPMENT INSTALLED	HNU
1					4" asphalt Gravel rubble to 3'				
2									
3	1	3'-5'	2/3/5/5	2.0/2.0	Brown silty clay fill Lab sample				1/2
4									
5	2	5'-7'	3/3/5/7	2/1.5	Same as above with sand				1/2
6									
7	3	7'-9'	2/4/4/6	2/2	Brown silty clay with ruble, glass and brick shards				1/2
8								8	
9	4	9'-11'	---	2/2	Lab sample Very stiff dark brown silty clay, increasing moisture				7
10									
11	5	11'-13'	---	2/2	Soft, grey-brown silty clay, increasing silt and moisture content				3
12									
13	6	13'-15'	3/4/4/8	2/2	Same as above, soft				3
14									
15	7	15'-17'	1/3/5/5	2/2	Olive green soft, moist, silty clay				5
16									
17	8	17'-19'	2/3/3/4	2/2	Green silty clay, high silt content, soft				15
18									
19					Saturated zone				
20					E.O.B.				
21									

NOTES:

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	NUMBER: SB-9 SHEET 1 of 1
CLIENT: Monsanto Company PROJECT LOCATION: Monsanto Queeny Plant	GROUND WATER DATE DEPTH ELEVATION	FILE No.: 2600.024 DRILLING METHOD: SAMPLER TYPE: 2-1/4" HSA Split Spoon HAMMER: FALL:
O'BRIEN & GERE GEOLOGIST: LS Douglas BORING CO.: Layne Western FOREMAN:	BORING LOCATION: GROUND ELEVATION: DATES: STARTED: 09/02/93	RIG: TOC: ENDED: 09/02/93

DEPTH	Sample No.	Sample Depth	Sample Blows /6"	Sample Penetration/ Recovery	SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	LITHOLOGY	EQUIPMENT INSTALLED	HNU
1					6" concrete Gravel rubble fill to 3' from grade				
2									
3	1	3'-5'	6/3/4/6	2.0/1.0	6" gravel 6" sand (possibly storm sewer line backfill) Lab sample				1
4									
5	2	5'-7'	3/3/4/7	2/1.0	Sand, dry				1/2
6									
7	3	7'-9'	2/2/2/2	2.0/1.0	Wet sand				1
8									
9	4	9'-11'	1/1/2/2	2.0/1.0	Wet sand & gravel				1
10									
11	5	11'-13'	10/4/4/4	2.0/1.5	1' of wet gravel 6" soft grey silty clay Lab sample				1
12									
13									
					E.O.B. 13'				
14									
15									
16									
17									
18									
19									
20									
21									

NOTES:

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	NUMBER: SB-10 SHEET 1 of 1
CLIENT: Monsanto Company PROJECT LOCATION: Monsanto Queeny Plant	GROUND WATER DATE DEPTH ELEVATION	FILE No.: 2600.024 DRILLING METHOD: SAMPLER TYPE: 2-1/4" HSA Split Spoon HAMMER: FALL:
O'BRIEN & GERE GEOLOGIST: LS Douglas BORING CO.: Layne Western FOREMAN:	BORING LOCATION: GROUND ELEVATION: DATES: STARTED: 09/02/93	RIG: TOC: ENDED: 09/02/93

DEPTH	Sample No.	Sample Depth	Sample Blows /6"	Sample Penetration/ Recovery	SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	LITHOLOGY	EQUIPMENT INSTALLED	HNU
1					12" concrete and fill				
2	1	2'-4'	2/5/7/8	2.0/1.5	Stiff dark grey-black silty clay Slightly moist Lab sample				0
3									
4	2	4'-6'	3/6/8/7	2.0/2.0	Very stiff dark grey and black streaks silty clay, slightly moist				0
5									
6	3	6'-8'	2/5/6/6	2.0/2.0	Grey-green, brown & black mottled silty clay, slightly moist Lab sample Refusal at 7'-10"				0
7									
8					Limestone bedrock at 8'			8	
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									

NOTES:

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	NUMBER: SB-11 SHEET 1 of 1
CLIENT: Monsanto Company PROJECT LOCATION: Monsanto Queeny Plant	GROUND WATER DATE DEPTH ELEVATION	FILE No.: 2600.024 DRILLING METHOD: SAMPLER TYPE: 2-1/4" HSA Split Spoon HAMMER: FALL:
O'BRIEN & GERE GEOLOGIST: LS Douglas BORING CO.: Layne Western FOREMAN:	BORING LOCATION: GROUND ELEVATION: DATES: STARTED: 09/03/93	RIG: TOC: ENDED: 09/03/93

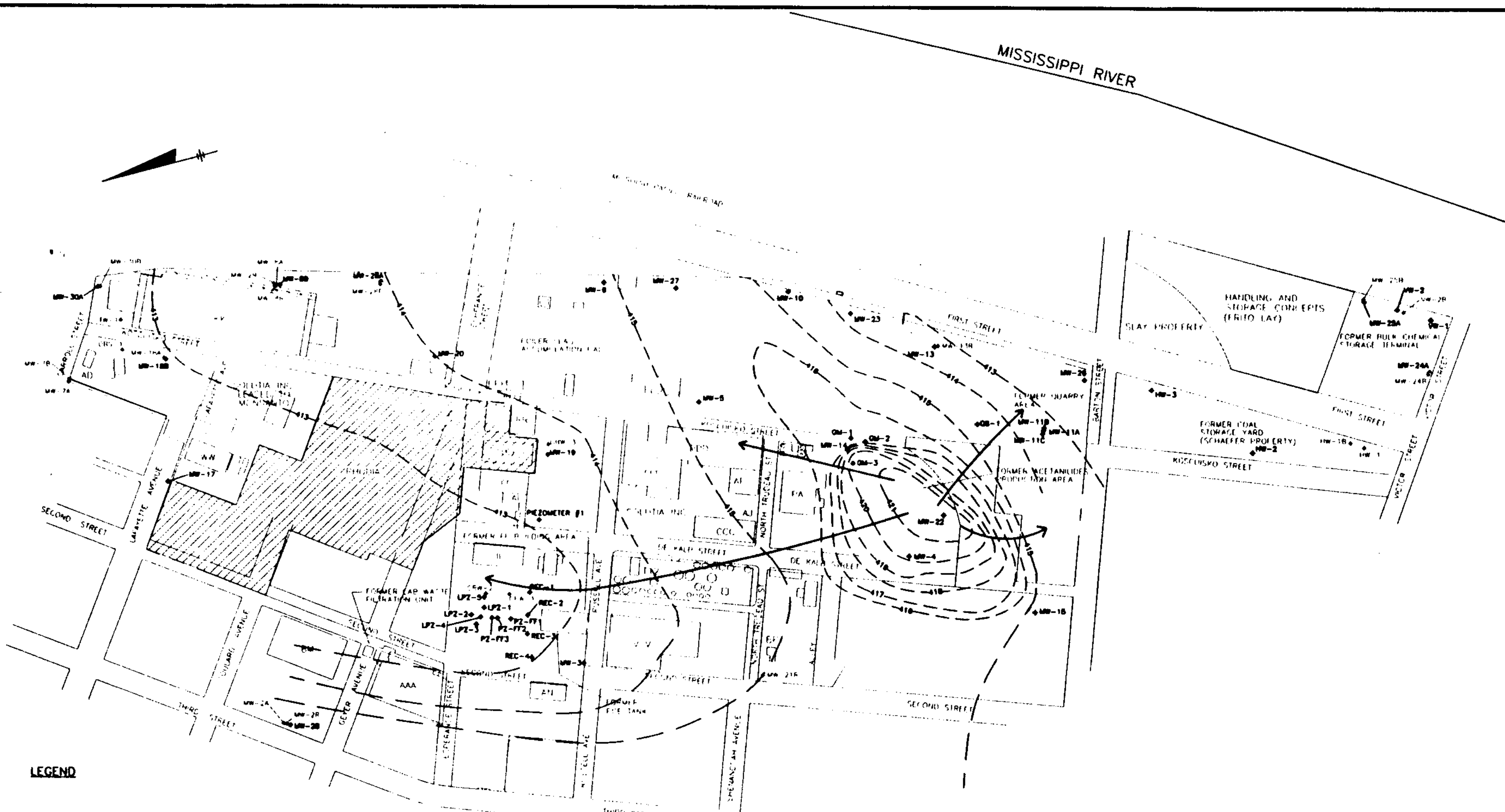
DEPTH	Sample No.	Sample Depth	Sample Blows /6"	Sample Penetration/ Recovery	SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	LITHOLOGY	EQUIPMENT INSTALLED	HNU
1					5' of gravel and rubble				
2									
3									
4									
5	1	5'-7'	4/7/13/9	2.0/1.0	Dark brown silty clay with brick shards, slightly moist Lab sample				1/2
6									
7	2	7'-9'	2/4/6/10	2.0/2.0	Very stiff dark brown and grey silty clay, slightly moist				1/2
8									
9	3	9'-11'	2/5/5/7	2.0/2.0	9'-10' very stiff dark grey silty clay 10'-11' black silty clay, slightly moist Lab sample				1
10									
11	4	11'-13'	1/2/3/4	2.0/2.0	Black soft silty clay, some dark grey zones, moist				1
12									
13	5	13'-15'	1/3/2/3		Same as above, possibly coal fines				0
14									
15	6	15'-17'	1/2/3/4		15'-16' black silty clay, same as above 16'-17' green-grey silty caly				1/2
16									
17					Saturated zone				
18									
19									
20									
21									

NOTES:

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	NUMBER: GP-22 SHEET 1 of 1
CLIENT: Monsanto Company PROJECT LOCATION: Monsanto Queeny Plant	GROUND WATER DATE DEPTH ELEVATION	FILE No.: 2600.024 DRILLING METHOD: SAMPLER TYPE: HAMMER: Geotrace Probe FALL:
O'BRIEN & GERE GEOLOGIST: LS Douglas BORING CO.: Geotrace Environmental FOREMAN: John Upcraft	BORING LOCATION: GROUND ELEVATION: DATES: STARTED: 08/30/93	RIG: TOC: ENDED: 08/30/93

DEPTH	Sample No.	Sample Depth	Sample Blows /6"	Sample Penetration/ Recovery	SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	LITHOLOGY	EQUIPMENT INSTALLED	HNU
0					3" asphalt				
	1	0'-4'		4/2	1.5' gravel fill				1
1					0.5' dark brown silty clay				
					dry				
2									
3									
4									
	2	4'-6'		2/1.5	Dark brown silty clay, moist				1
5									
6									
	3	6'-8'		2/2	Dark brown with some light brown mottling,				1/2
7					some black streaking				
8					Saturated zone				
	4	8'-10'		2/1.5	Same as above				1
9									
10									
					E.O.B. - 10'				
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

NOTES:



LEGEND

⊕	GROUNDWATER MONITORING WELLS AND PIEZOMETERS
MW-15	WELLS SCREENED IN THE FILL & SILTY CLAY (BOLD FONT)
OBW-3	WELLS SCREENED IN THE SAND OR BEDROCK (GRAYSCALE FONT)
—388—	GROUNDWATER CONTOUR (BASED ON MEASUREMENTS RECORDED ON AUG 1-2, 2000)
⟶	ESTIMATED GROUNDWATER FLOW

NOTES:

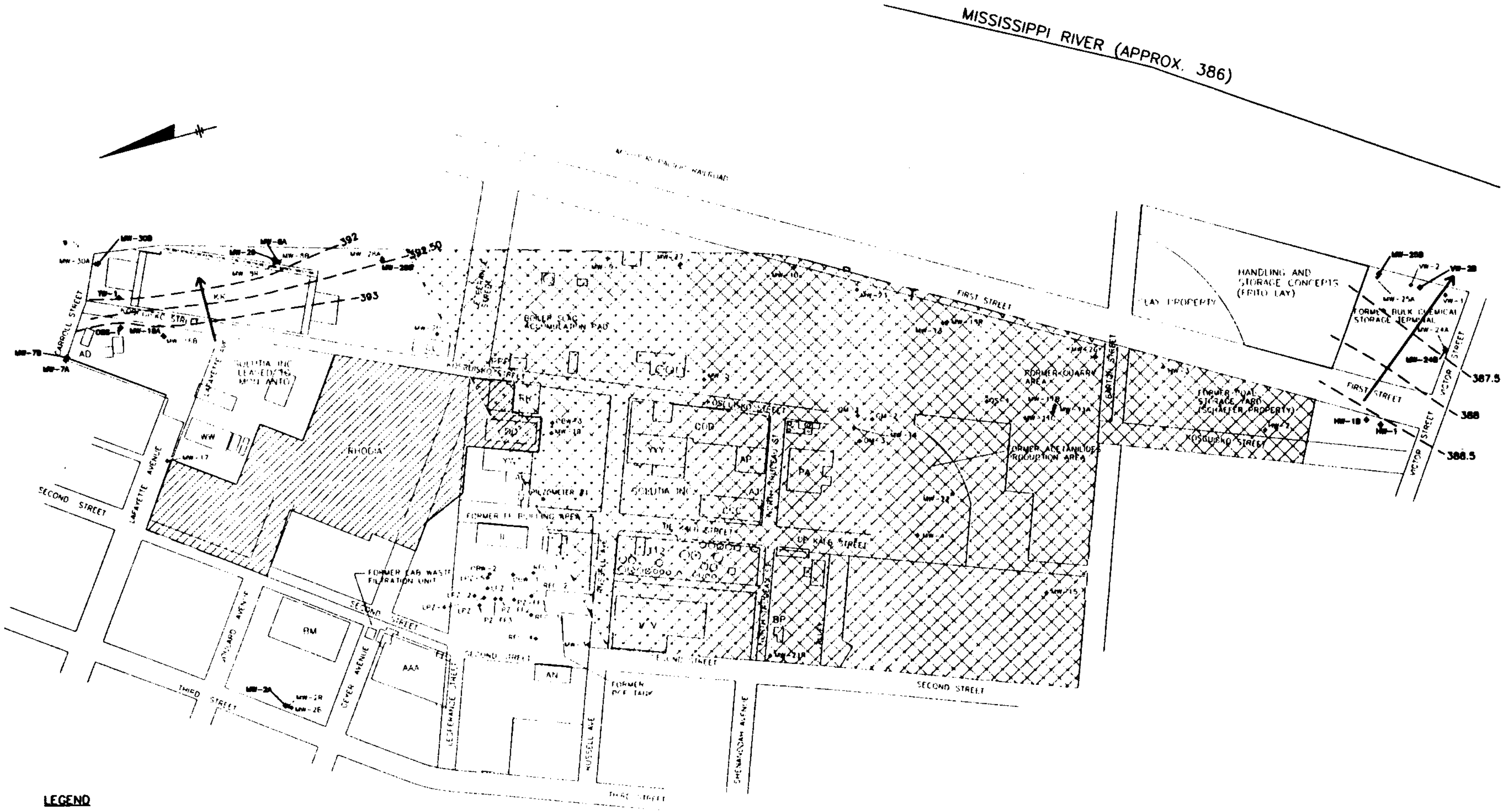
1. LOCATION OF MISSISSIPPI RIVER IS APPROXIMATE.
2. THE CONTOUR LINES DEPICT GENERALIZED FLOW CONDITIONS THAT WOULD BE EXPECTED GIVEN HOMOGENOUS MATERIAL TYPES IN THIS UNIT. IN REALITY, THE MATERIAL TYPES IN THIS UNIT ARE HETEROGENOUS. IT IS EXPECTED THAT THE CONTOUR LINES WOULD BE MUCH MORE LOCAL IN VARIABILITY AND ORIENTATION IF THE PIEZOMETRIC DATA POINTS WERE MORE CLOSELY SPACED.

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

300 0 300 600

1"=300'

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI		PROJECT NO. 2320000058.00
URS		
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Estimated Groundwater Contours of the Fill & Silty Clay	FIG NO 16



LEGEND

⌖	GROUNDWATER MONITORING WELLS AND PIEZOMETERS
▩	SAND IS ABSENT
MW-2A	WELLS SCREENED IN THE SAND (BOLD FONT)
MW-4	WELLS SCREENED IN THE FILL & SILTY CLAY OR BEDROCK (GRAYSCALE FONT)
—388—	GROUNDWATER CONTOUR (BASED ON MEASUREMENTS RECORDED ON AUG 1-2, 2000)
⟶	ESTIMATED GROUNDWATER FLOW
NOTE:	LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

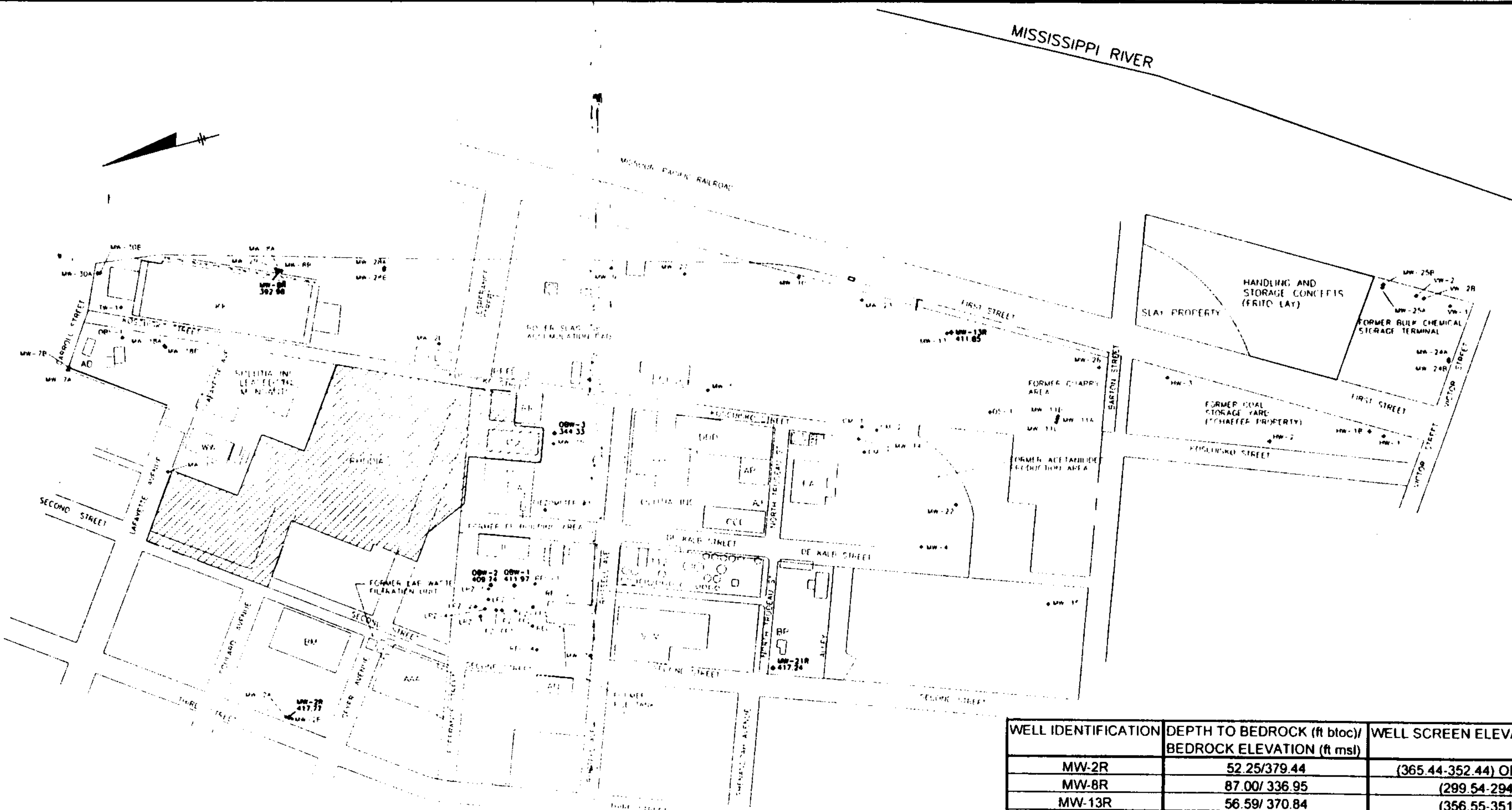
300 0 300 600

1"=300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Estimated Groundwater Contours of the Sand — FIG NO 17

File: K:\ENVIRON\23-20000058.00 (SOLUTIA QUEENY)\CADD\2320000058.00(NEW)\050 (WELL PZ SAND.DWG Last edited: DEC. 07, 00 @ 10:23 p.m. URS Corp.



WELL IDENTIFICATION	DEPTH TO BEDROCK (ft btoc)/ BEDROCK ELEVATION (ft msl)	WELL SCREEN ELEVATION (ft msl)
MW-2R	52.25/379.44	(365.44-352.44) OPEN HOLE
MW-8R	87.00/ 336.95	(299.54-294.54)
MW-13R	56.59/ 370.84	(356.55-351.55)
MW-21R	9.34/ 417.83	(407.88-395.88) OPEN HOLE
OBW-1	60.54/ 366.44	(356.44-346.44)
OBW-2	58.97/ 367.44	(337.64-327.64)
OBW-3	16.58/ 408.74	(339.74-324.74)

300 0 300 600

1" = 300'

LEGEND

⌖	GROUNDWATER MONITORING WELLS AND PIEZOMETERS
MW-21R	WELLS SCREENED IN THE BEDROCK (BOLD FONT)
MW-15	WELLS SCREENED IN THE FILL & SILTY CLAY OR SAND (GRAYSCALE FONT)
417.24	GROUNDWATER ELEVATION IN THE BEDROCK (MEASUREMENTS RECORDED ON AUG. 1-2, 2000)
NOTE:	LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC.
QUEENY PLANT
ST. LOUIS, MISSOURI

PROJECT NO. 2320000058.00

URS

DRN. BY: chs 11/16/00
DSGN. BY: tjo
CHKD. BY:

Groundwater Elevations in the Bedrock

FIG. NO. 18

Appendix D

Hydraulic Conductivity Test Results

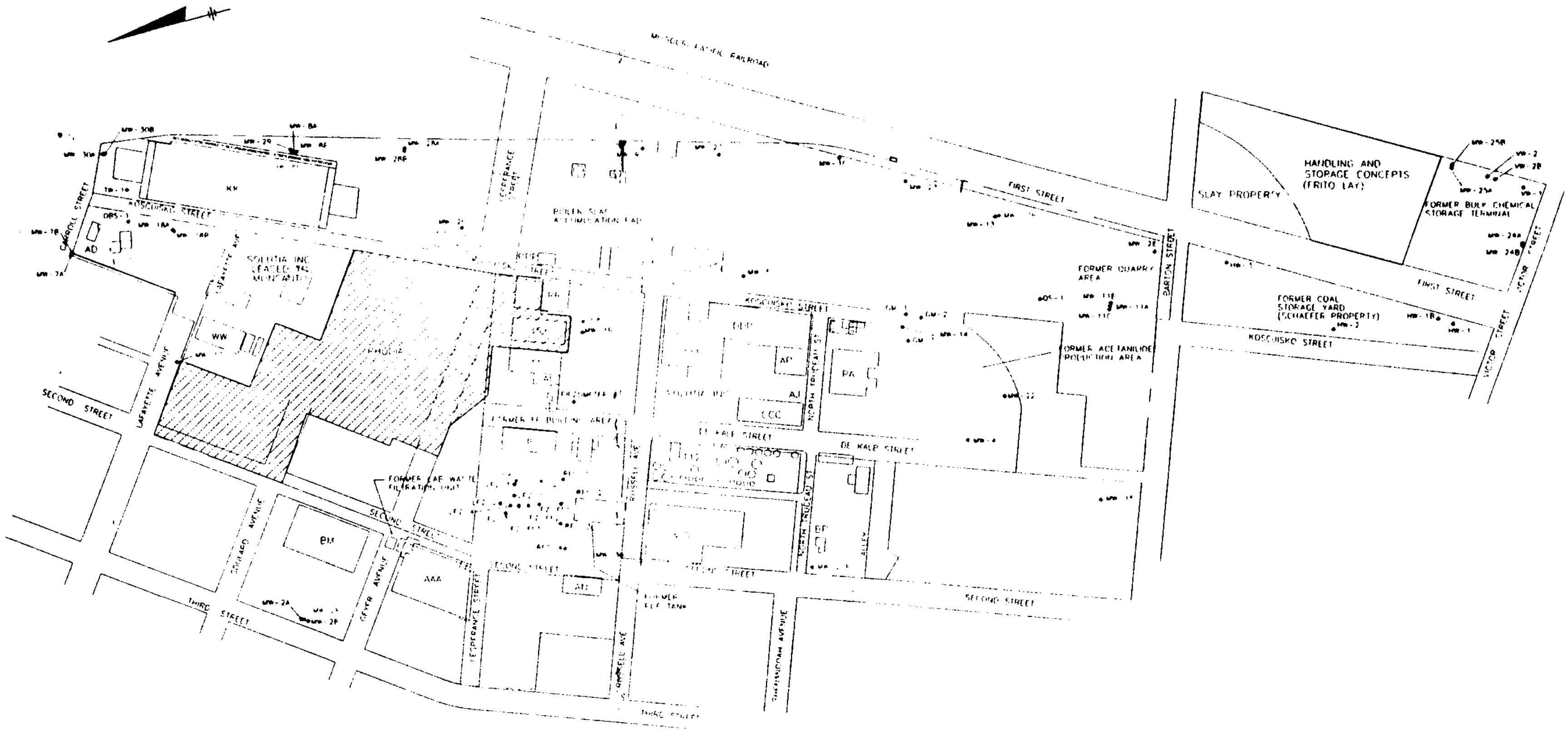
Table 4. *Ground water velocities.*

Hydrostratigraphic unit	Hydraulic conductivity (m/day)	Hydraulic gradient (cm/cm)	Effective porosity (dim.)	Velocity (m/day)
Fill	6.48	0.005 0.009	0.1	0.27 0.48
Silt 1*	0.052	0.006 0.009	0.1	0.002 0.004
Sand 1	52.7	0.006 0.008	0.25	1.2 1.6

*For the purpose of providing estimates, the Silt 1 values will be used for Silty Clay 1.
Source: O'Brien & Gere Engineers, Inc.

Appendix E

Well Completion/Location Data



LEGEND (GROUNDWATER MONITORING WELLS AND PIEZOMETERS)

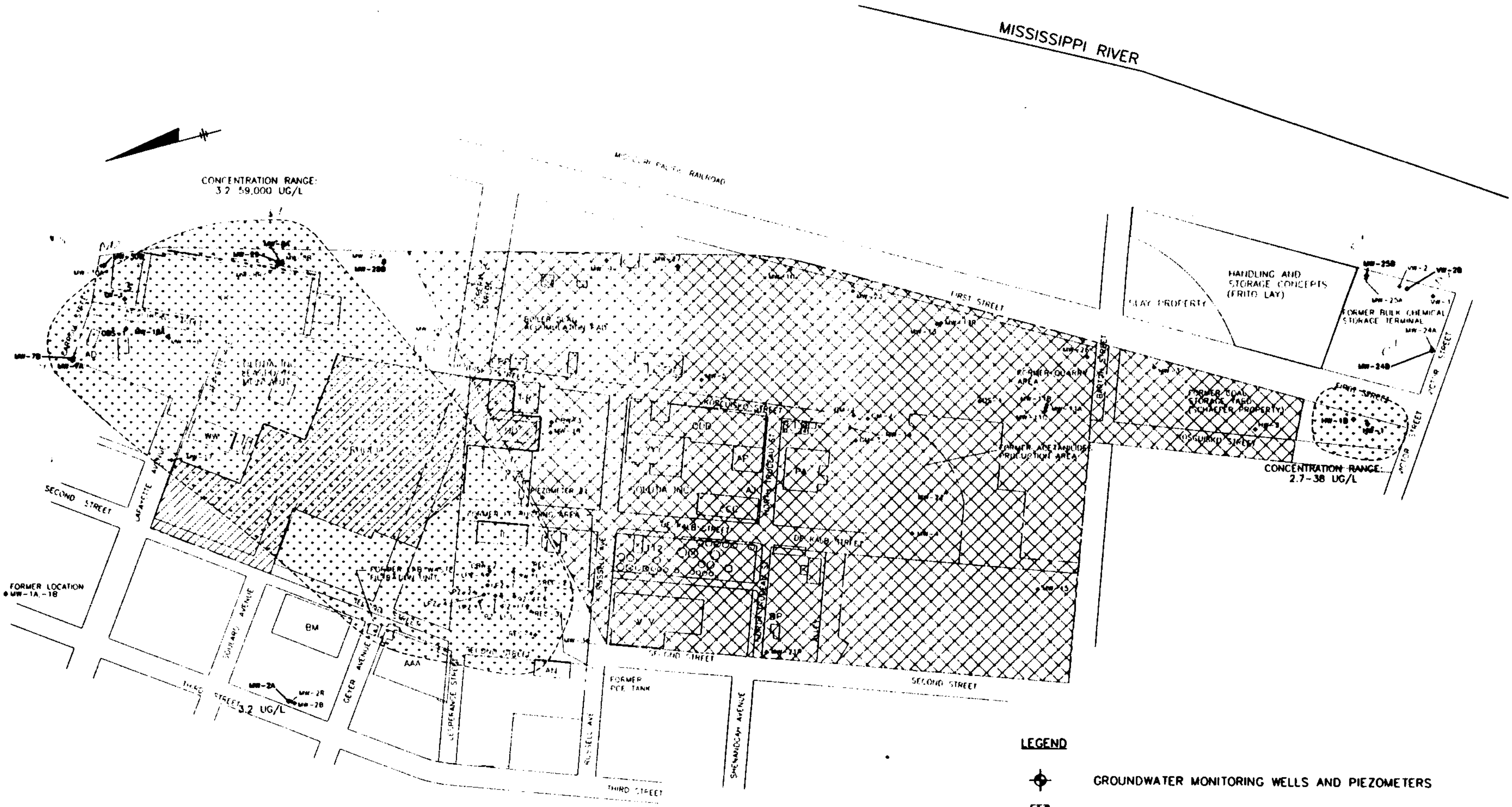
MW-7A WELLS SCREENED IN THE SAND

NOTE: LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Groundwater Monitoring Well & Piezometer Location Map — FIG. NO. 13

Appendix F

Contaminant Extent Figures



LEGEND

- GROUNDWATER MONITORING WELLS AND PIEZOMETERS
- SAND IS ABSENT
- MW-2A — WELLS SCREENED IN THE SAND (BOLD FONT)
- MW-15 — WELLS SCREENED IN THE FILL & SILTY CLAY OR BEDROCK (GRAYSCALE FONT)
- EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR TETRACHLOROETHENE (PCE)

300 0 300 600

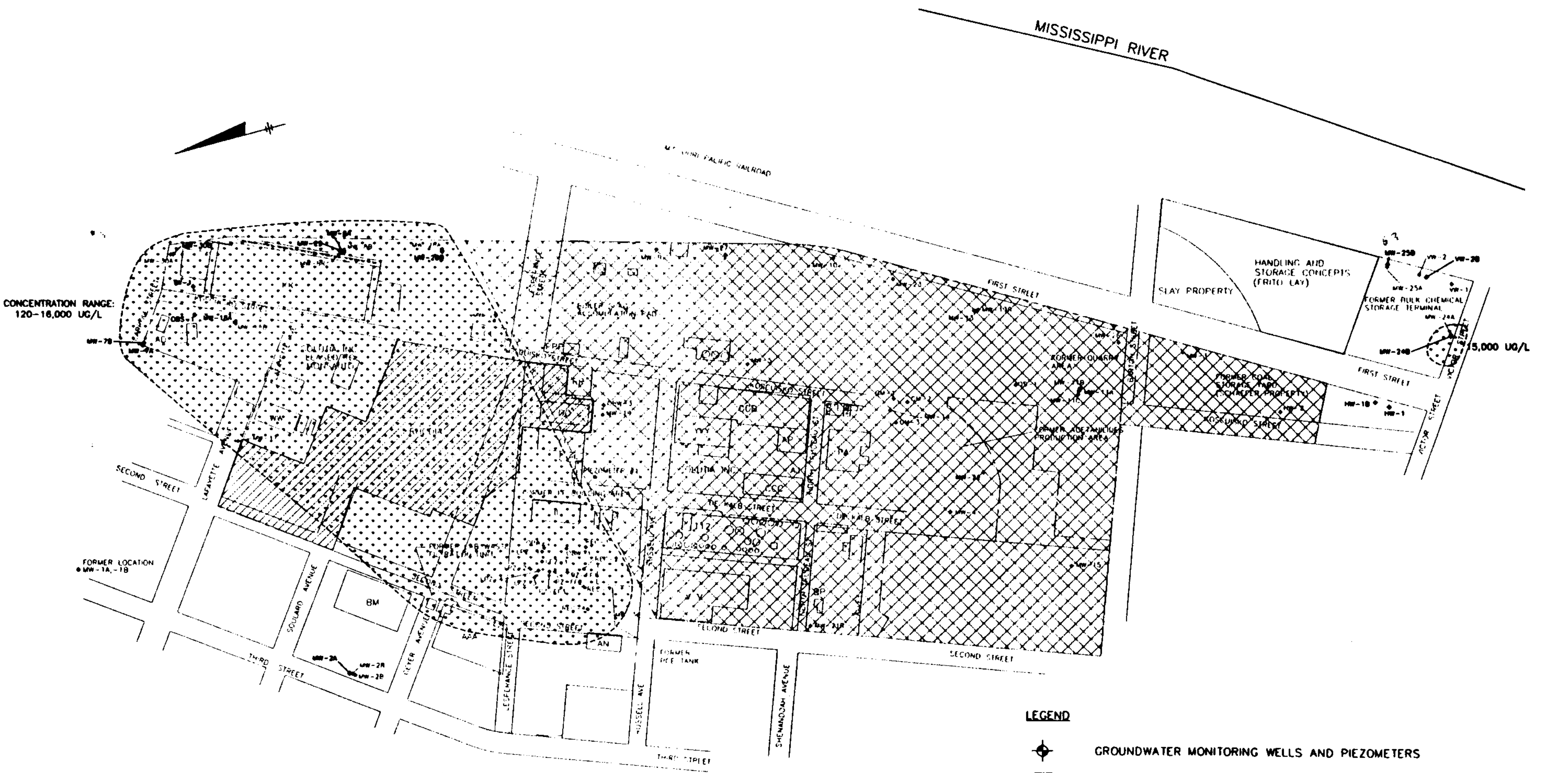
1" = 300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

NOTE:

1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI		PROJECT NO. 2320000058.00
URS		
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Tetrachloroethene Groundwater Concentrations of the Sand	FIG. NO 24



LEGEND

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

SAND IS ABSENT

MW-2A WELLS SCREENED IN THE SAND (BOLD FONT)

MW-15 WELLS SCREENED IN THE FILL & SILTY CLAY OR BEDROCK (GRAYSCALE FONT)

EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR CHLOROBENZENE

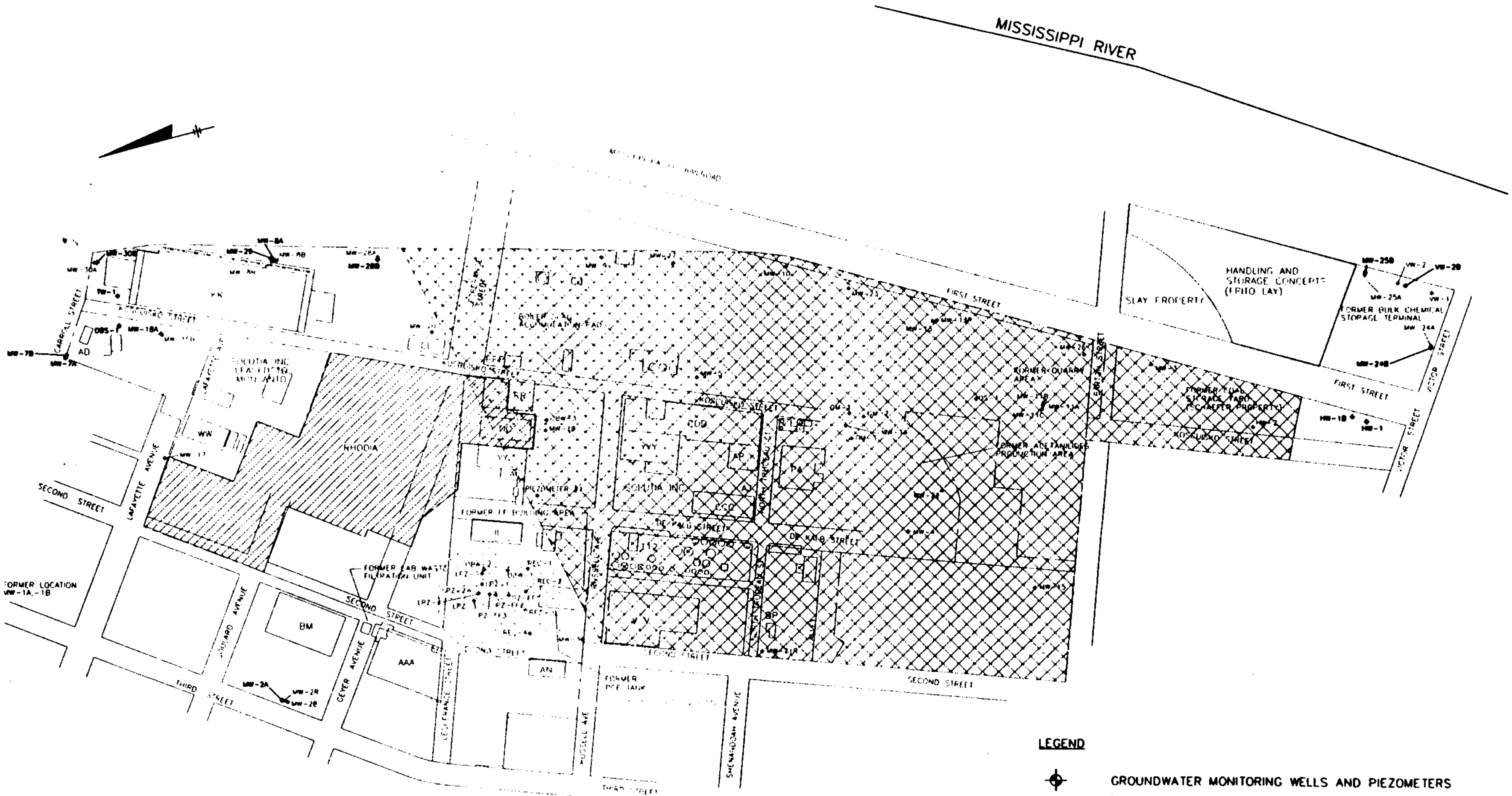
300 0 300 600

1"=300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI		PROJECT NO. 2320000058.00
URS		
DRN. BY: chs 11/16/00 DSGN. BY: tja CHKD. BY:	Chlorobenzene Groundwater Concentrations of the Sand	FIG. NO 25

NOTE:
1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.



LEGEND

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

SAND IS ABSENT

MW-2A WELLS SCREENED IN THE SAND (BOLD FONT)

MW-15 WELLS SCREENED IN THE FILL & SILTY CLAY OR BEDROCK (GRAYSCALE FONT)

EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR TOLUENE

NOTES:

1. CONCENTRATIONS OF ALACHLOR DO NOT EXCEED SCREENING LEVELS.
2. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

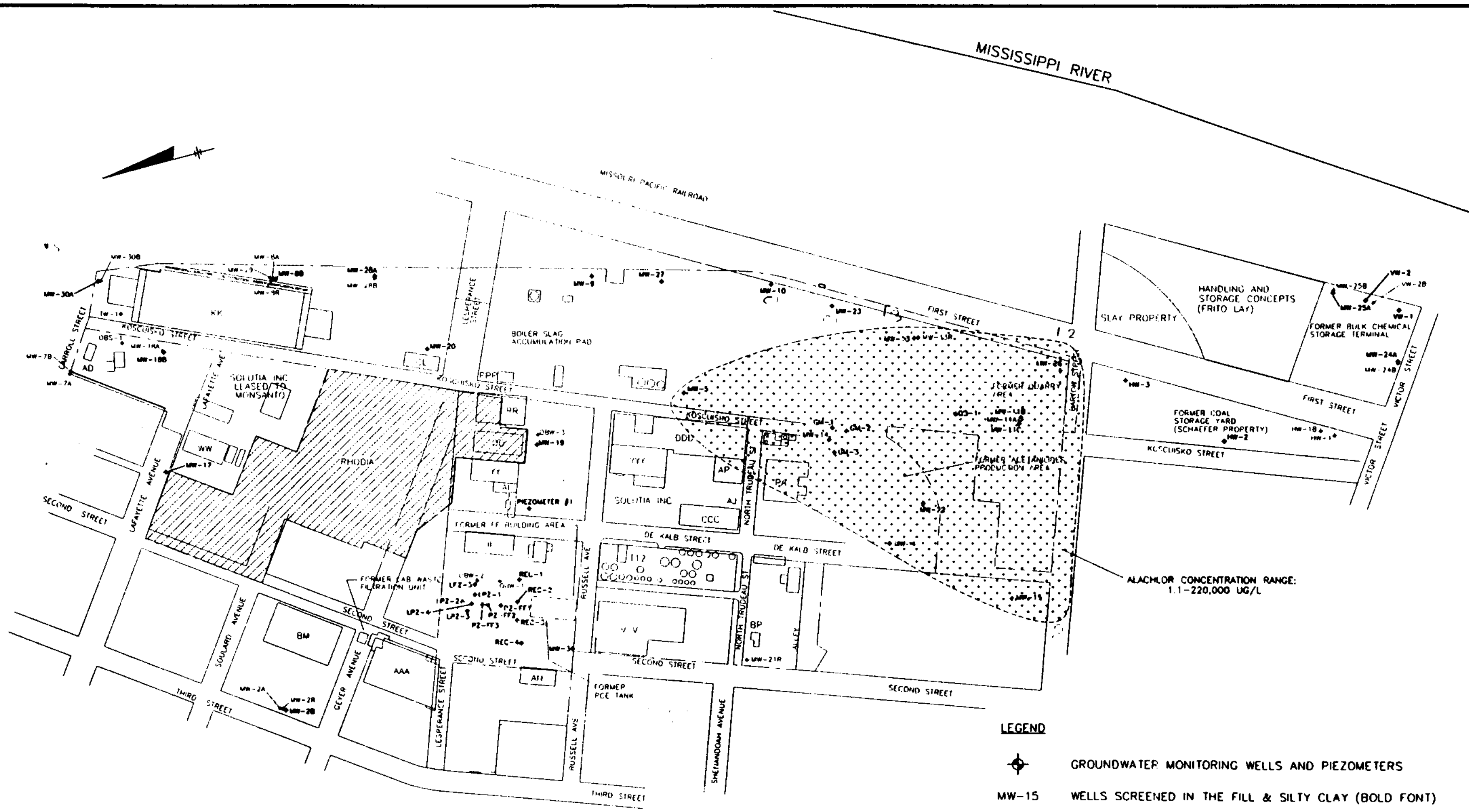
300 0 300 600

1"=300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tja CHKD. BY:	Alachlor/Toluene Groundwater Concentrations of the Sand — FIG. NO. 26

File: K:\ENVIRON\23-20000058.00 (SOLUTIA QUEENY)\CADD\2320000058.00(NEW)\050 (WELL_PZ_SAND_CONCENTRATIONS).DWG Last edited: DEC. 07, 00 @ 7:24 a.m. URS Corp.



LEGEND

⌖	GROUNDWATER MONITORING WELLS AND PIEZOMETERS
MW-15	WELLS SCREENED IN THE FILL & SILTY CLAY (BOLD FONT)
MW-2A	WELLS SCREENED IN THE SAND OR BEDROCK (GRAYSCALE FONT)
	EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR ALACHLOR
	EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR TOLUENE

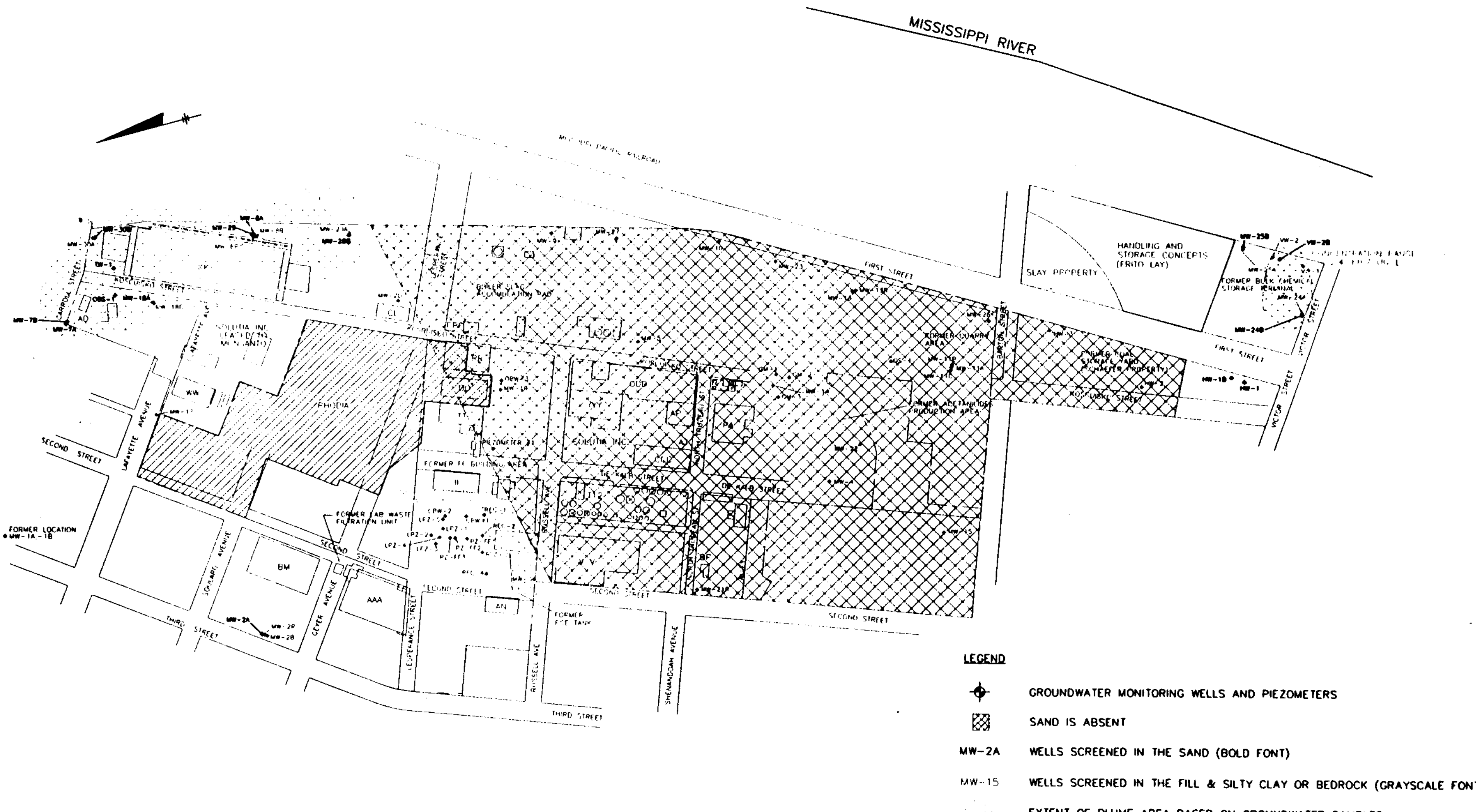
REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

300 0 300 600
1"=300'

NOTE:
1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tja CHKD. BY:	Alachlor/Toluene Groundwater Concentrations of the Fill & Silty Clay — FIG. NO. 21

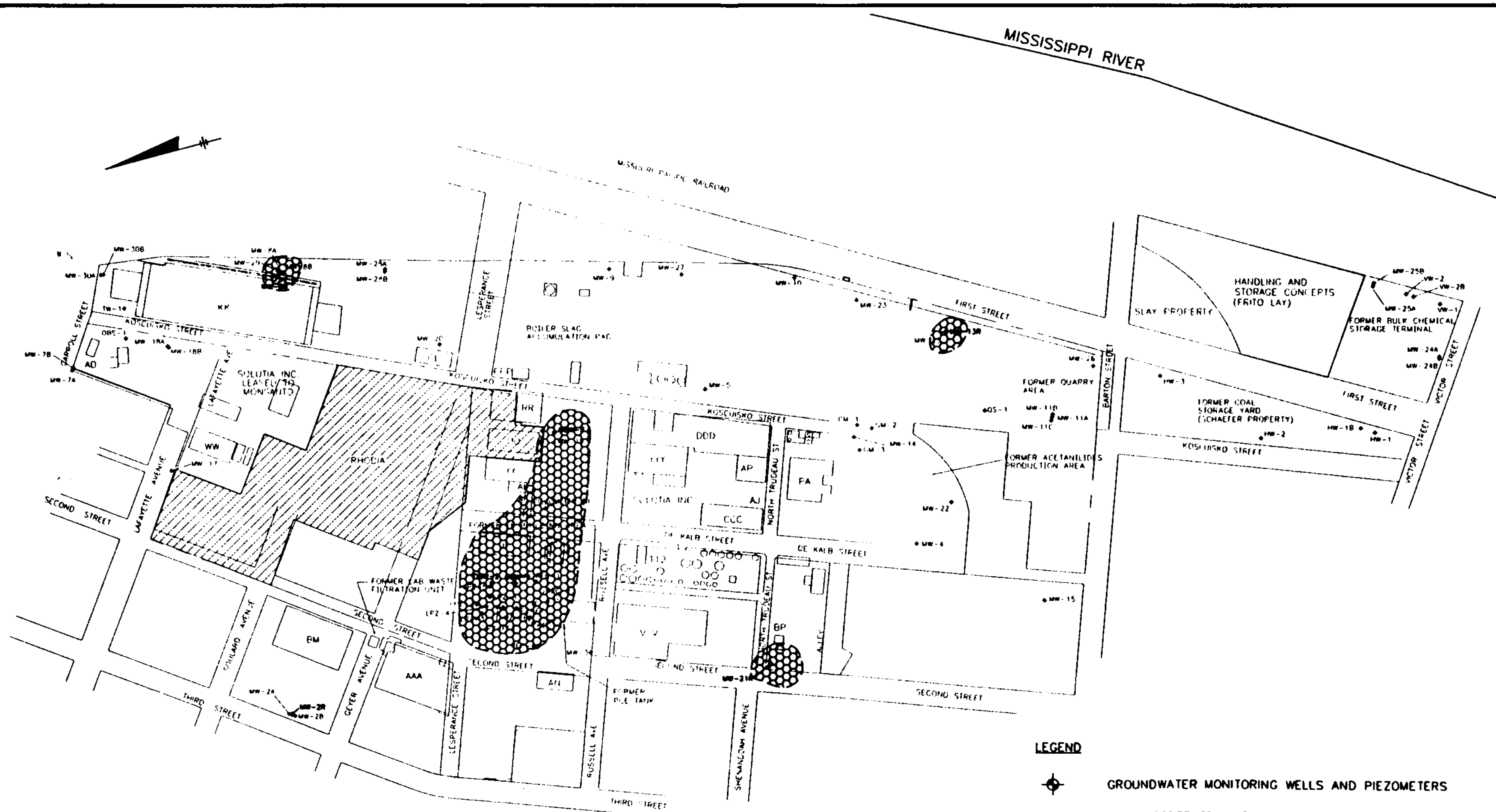
File: K:\ENVIRON\23-20000058.00 (SOLUTIA QUEENY)\CADD\2320000058.00(NEW)\050 (WELL P2 FILL & SILTY CLAY CONCENTRATIONS.DWG Last edited: DEC. 07, 00 @ 1:58 p.m. URS Corp



NOTE:
1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Polynuclear Aromatic Hydrocarbons Groundwater Concentrations of the Sand — FIG. NO. 27



LEGEND

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

MW-2R WELLS SCREENED IN THE BEDROCK (BOLD FONT)

MW-15 WELLS SCREENED IN THE FILL & SILTY CLAY OR SAND (GRAYSCALE FONT)

EXTENT OF COMPOSITE PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR ONE OR MORE OF THE FOLLOWING: ALACHLOR, CHLOROBENZENE, TOLUENE, TETRACHLOROETHENE OR THE TETRACHLOROETHENE DEGRADATION SUITE (TCE, DCE, OR VINYL CHLORIDE)

300 0 300 600

1"=300'

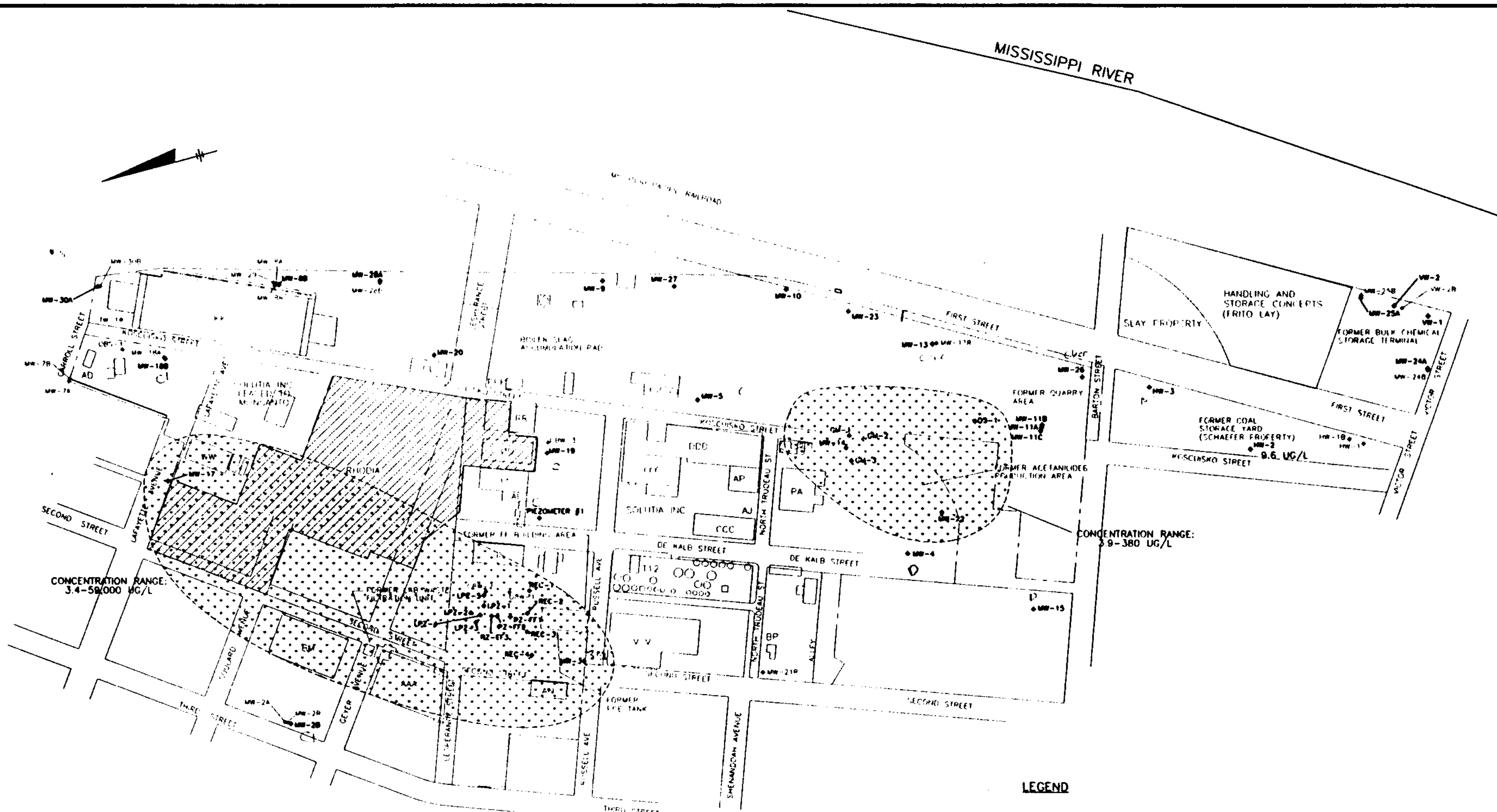
NOTE:

1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tja CHKD. BY:	Affected Groundwater–Bedrock Unit — FIG. NO. 33

File: K:\ENVIRON\23-20000058.00 (SOLUTIA QUEENY)\CADD\2320000058.00(NEW)\050 (WELL PZ BEDROCK CONCENTRATIONS.DWG Last edited: DEC. 07, 00 @ 7:23 a.m. URS Corp.



LEGEND

- GROUNDWATER MONITORING WELLS AND PIEZOMETERS
- MW-15 — WELLS SCREENED IN THE FILL & SILTY CLAY (BOLD FONT)
- MW-2A — WELLS SCREENED IN THE SAND OR BEDROCK (GRAYSCALE FONT)
- EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR TETRACHLOROETHENE (PCE)

300 0 300 600

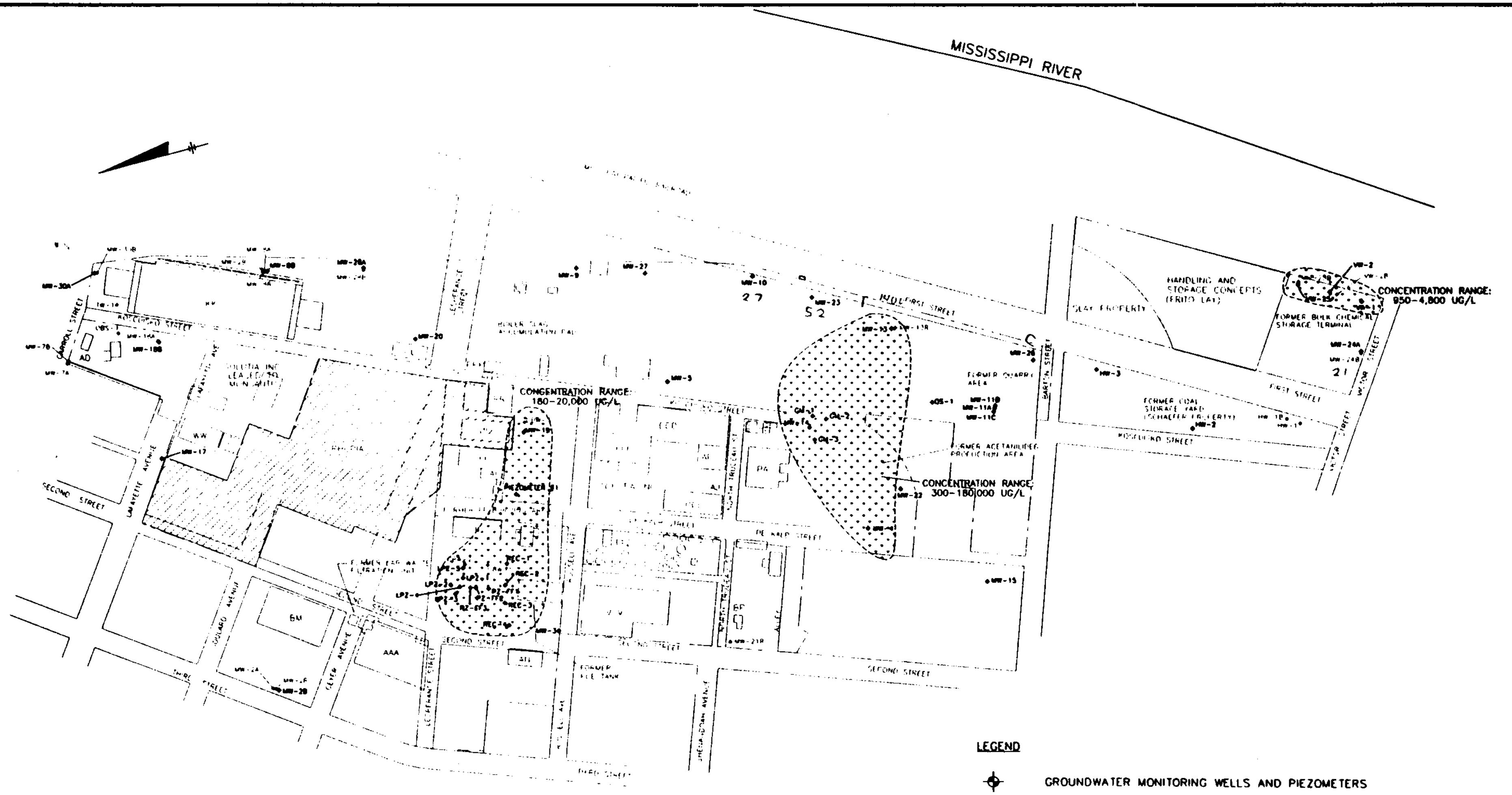
1"=300'

NOTE:

1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Tetrachloroethene Groundwater Concentrations of the Fill & Silty Clay
FIG NO	19



LEGEND

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

MW-15 WELLS SCREENED IN THE FILL & SILTY CLAY (BOLD FONT)

WELLS SCREENED IN THE SAND OR BEDROCK (GRAYSCALE FONT)

EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR CHLOROBENZENE

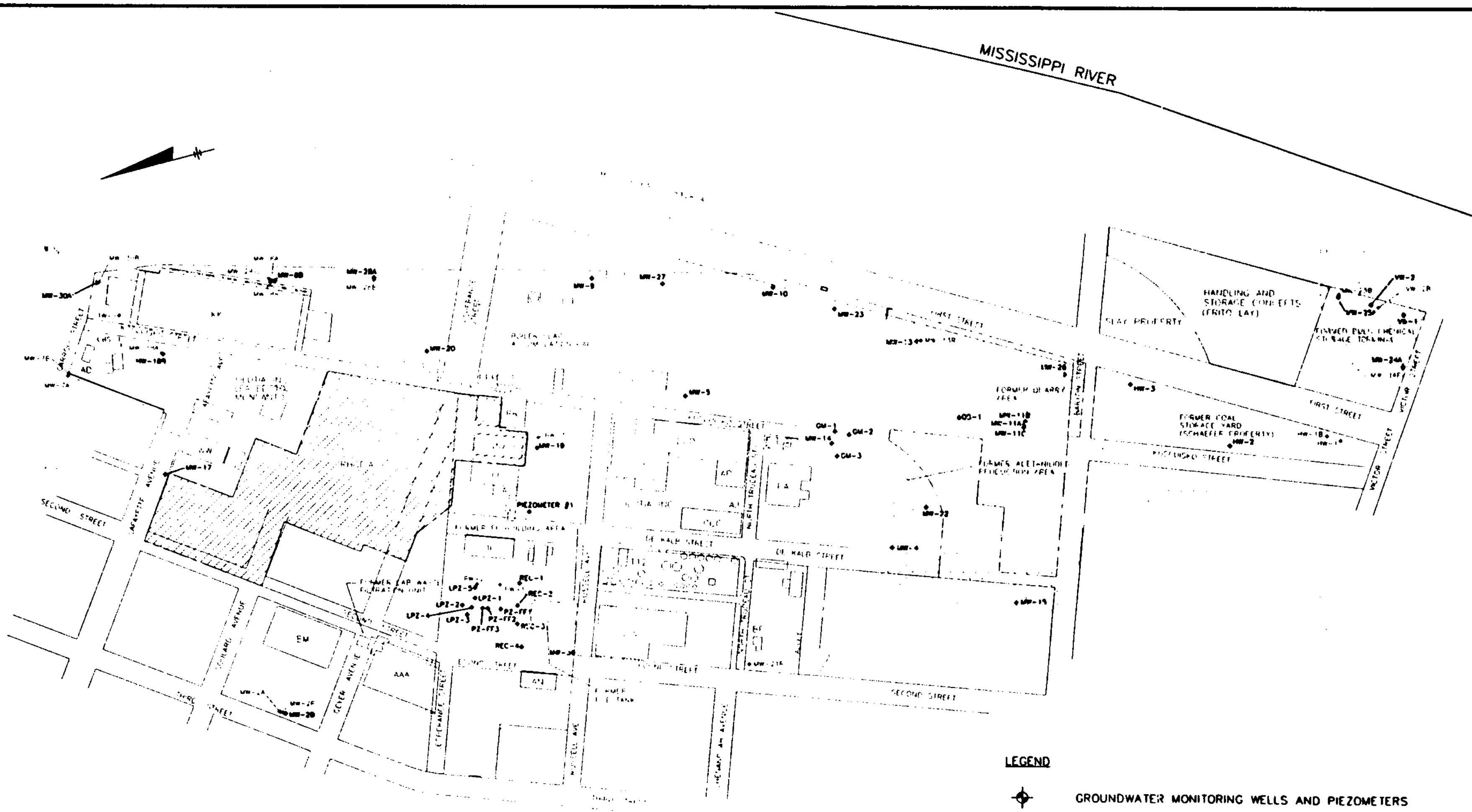
300 0 300 600

1"=300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

NOTE:
1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Chlorobenzene Groundwater Concentrations of the Fill & Silty Clay — FIG. NO 20



LEGEND

⌖	GROUNDWATER MONITORING WELLS AND PIEZOMETERS
MW-15	WELLS SCREENED IN THE FILL & SILTY CLAY (BOLD FONT)
MW-2A	WELLS SCREENED IN THE SAND OR BEDROCK (GRAYSCALE FONT)
	EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR POLYNUCLEAR AROMATIC HYDROCARBONS

NOTE:

1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

300 0 300 600

1"=300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Polynuclear Aromatic Hydrocarbons Groundwater Concentrations of the Fill & Silty Clay — FIG. NO. 22

LEGEND

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

MW-15 WELLS SCREENED IN THE FILL & SILTY CLAY (BOLD FONT)

MW-2A WELLS SCREENED IN THE SAND OR BEDROCK (GRAYSCALE FONT)

EXTENT OF COMPOSITE PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR ONE OR MORE OF THE FOLLOWING: ALACHLOR, CHLOROBENZENE, POLYNUCLEAR AROMATIC HYDROCARBONS, TOLUENE, TETRACHLOROETHENE OR THE TETRACHLOROETHENE DEGRADATION SUITE (TCE, DCE, OR VINYL CHLORIDE)

SOURCE AREA

300 0 300 600

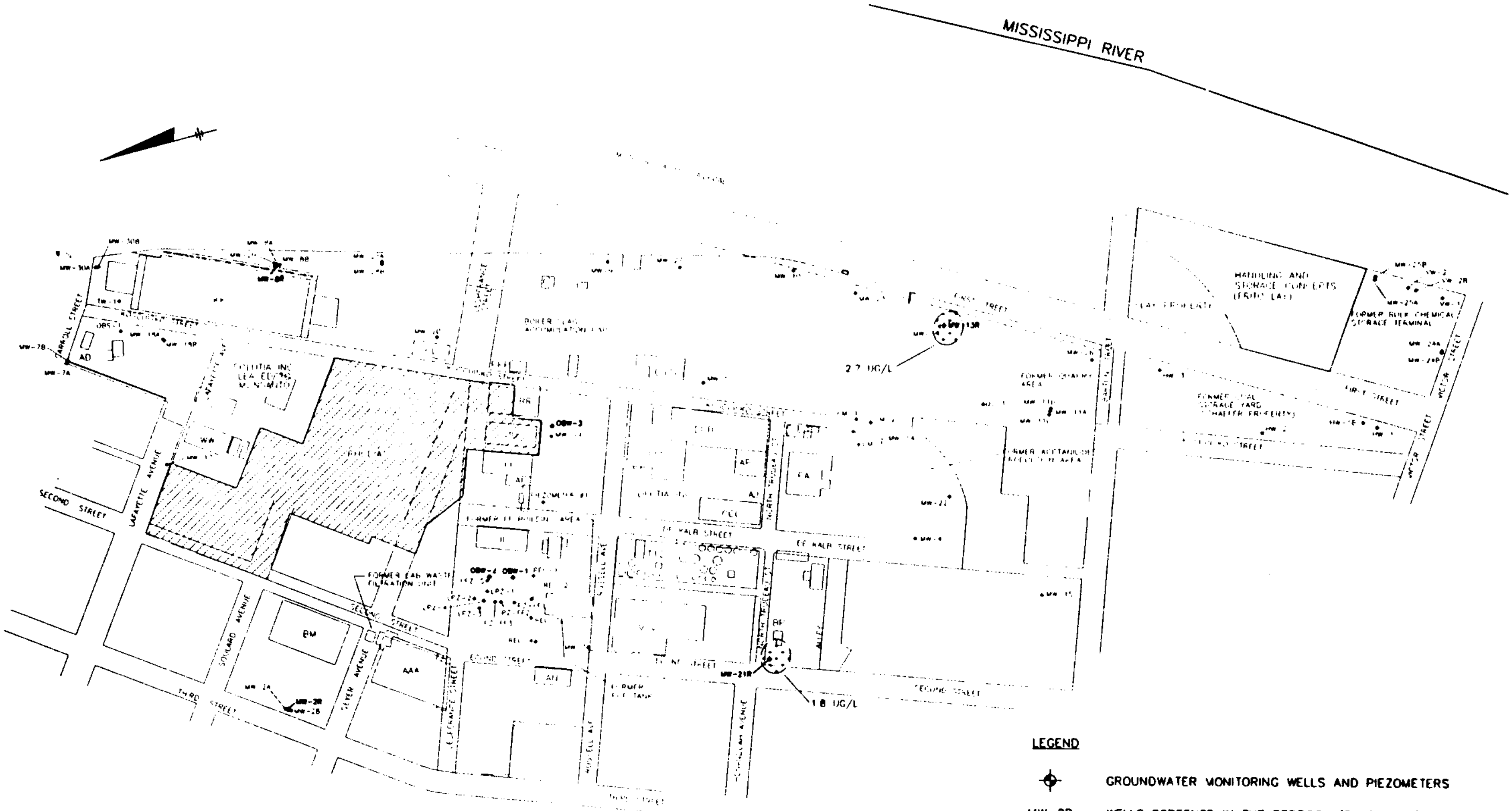
1"=300'

NOTE:

1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Composite Plumes– of the Fill & Silty Clay — FIG. NO 23



LEGEND

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

MW-2R — WELLS SCREENED IN THE BEDROCK (BOLD FONT)

WELLS SCREENED IN THE FILL & SILTY CLAY OR SAND (GRAYSCALE FONT)

EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR ALACHLOR

EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR TOLUENE

300 0 300 600

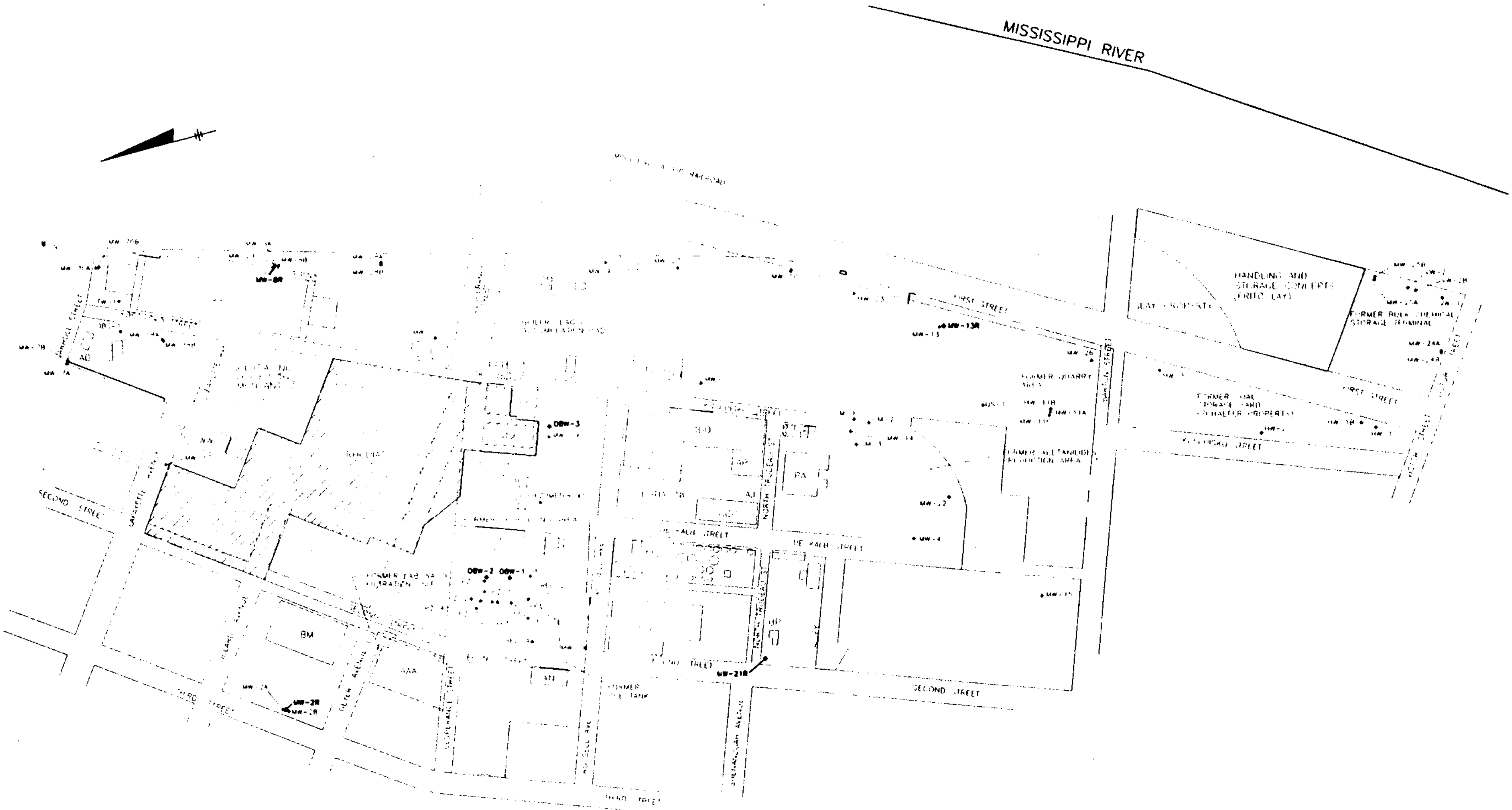
1" = 300'

NOTE:

1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00	
URS		
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Alachlor/Toluene Groundwater Concentrations of the Bedrock	FIG. NO. 31



LEGEND

⌖	GROUNDWATER MONITORING WELLS AND PIEZOMETERS
MW-2R	WELLS SCREENED IN THE BEDROCK (BOLD FONT)
MW-15	WELLS SCREENED IN THE FILL & SILTY CLAY OR SAND (GRAYSCALE FONT)

NOTES:

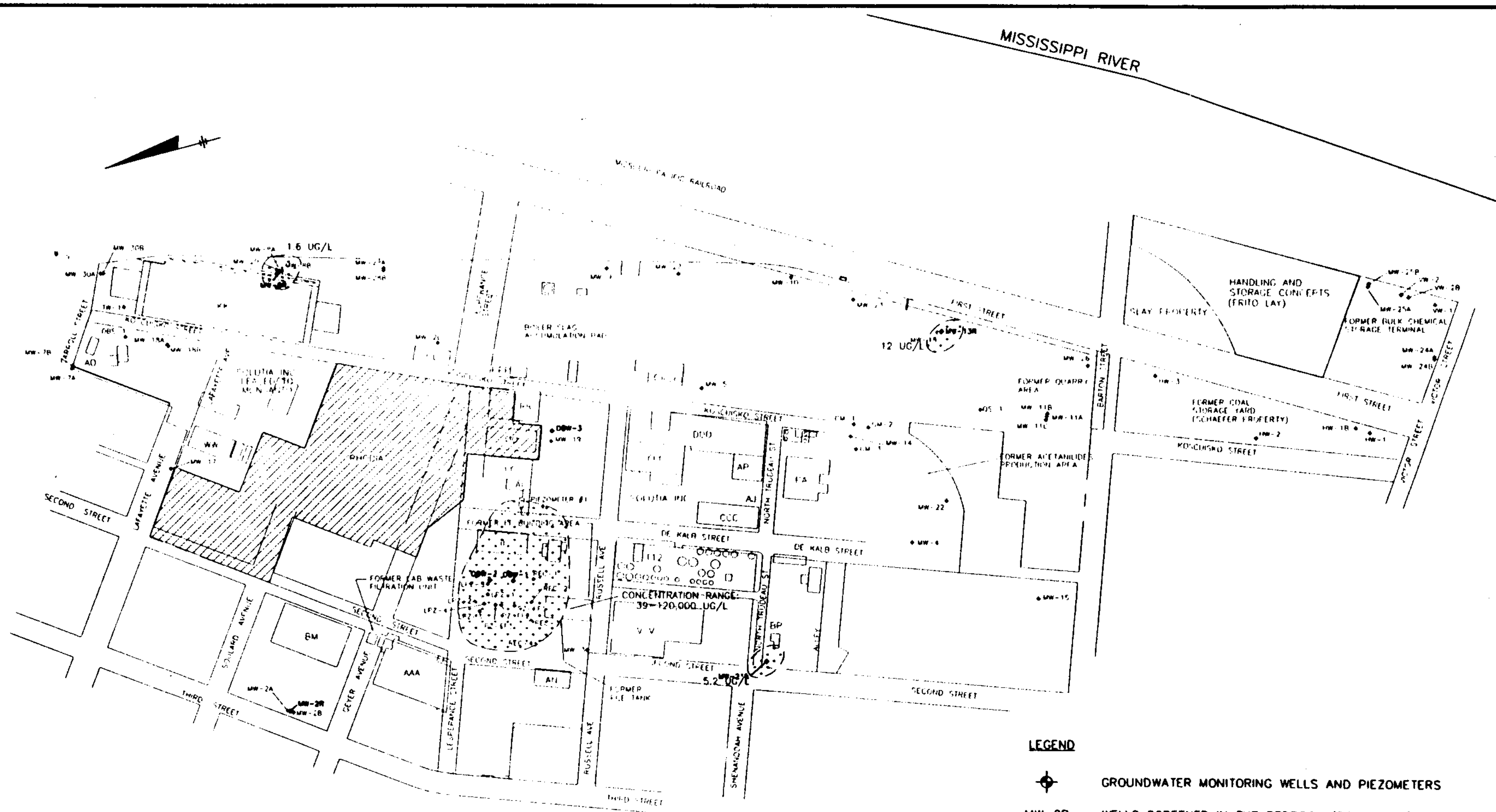
1. CONCENTRATIONS OF POLYNUCLEAR AROMATIC HYDROCARBONS DID NOT EXCEED SCREENING VALUES.
2. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

300 0 300 600

1"=300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN BY: tjo CHKD. BY:	Polynuclear Aromatic Hydrocarbons Groundwater Concentrations of the Bedrock — FIG. NO. 32



LEGEND

- GROUNDWATER MONITORING WELLS AND PIEZOMETERS
- MW-2R — WELLS SCREENED IN THE BEDROCK (BOLD FONT)
- MW-15 — WELLS SCREENED IN THE FILL & SILTY CLAY OR SAND (GRAYSCALE FONT)
- EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR TETRACHLOROETHENE

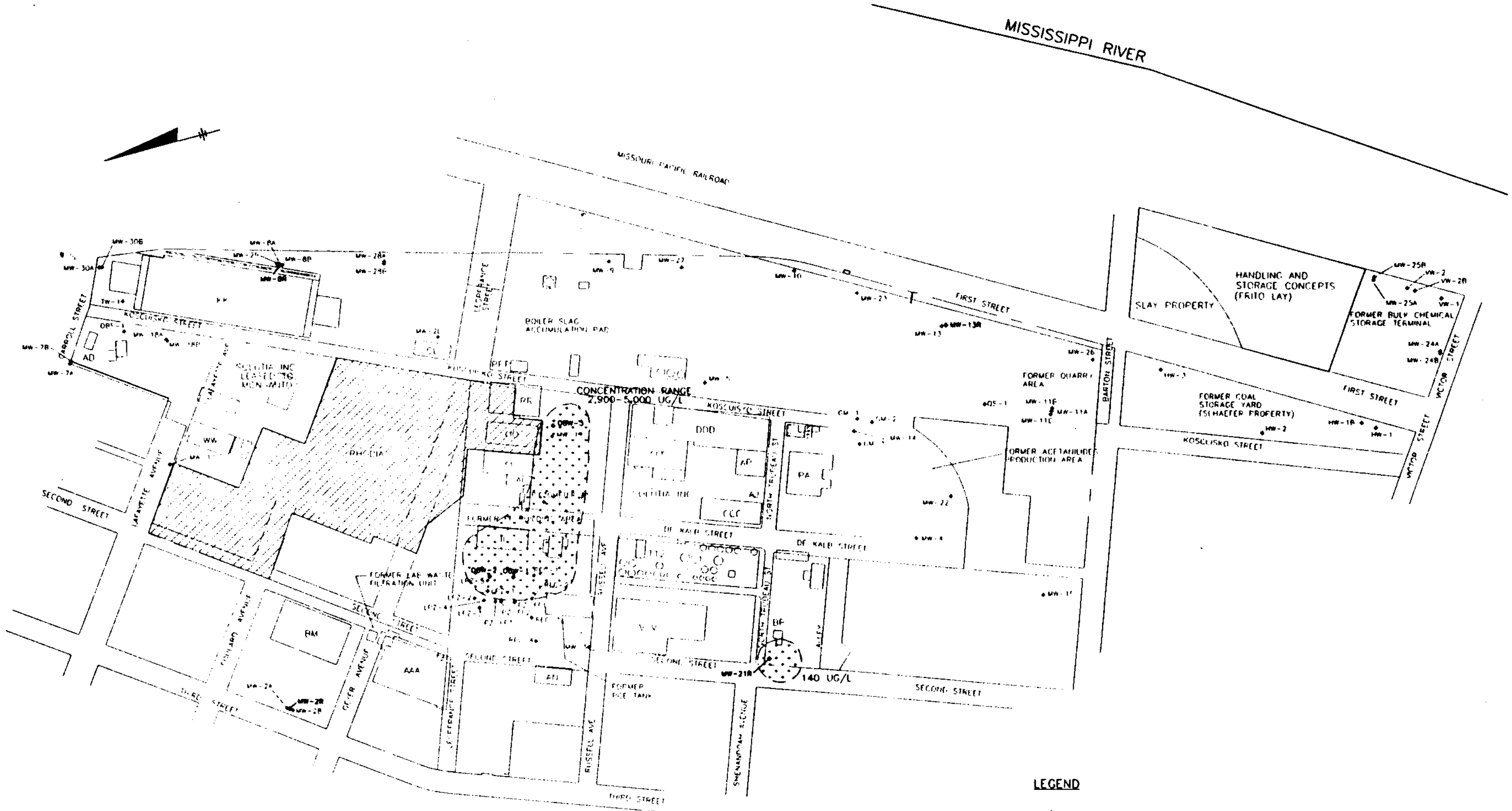
300 0 300 600

1"=300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

NOTE:
1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN. BY: tjo CHKD. BY:	Tetrachloroethene Groundwater Concentrations of the Bedrock — FIG. NO 29



LEGEND

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

MW-2R WELLS SCREENED IN THE BEDROCK (BOLD FONT)

WELLS SCREENED IN THE FILL & SILTY CLAY OR SAND (GRAYSCALE FONT)

EXTENT OF PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR CHLOROBENZENE

300 0 300 600

1"=300'

NOTE:

1 LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN BY: tjo CHKD. BY:	Chlorobenzene Groundwater Concentrations of the Bedrock — FIG. NO. 30

LEGEND

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

SAND IS ABSENT

MW-2A WELLS SCREENED IN THE SAND (BOLD FONT)

MW-15 WELLS SCREENED IN THE FILL & SILTY CLAY OR BEDROCK (GRAYSCALE FONT)

EXTENT OF COMPOSITE PLUME AREA BASED ON GROUNDWATER SAMPLES THAT EXCEEDED SCREENING LEVELS FOR ONE OR MORE OF THE FOLLOWING: CHLOROBENZENE, POLYNUCLEAR AROMATIC HYDROCARBONS, TETRACHLOROETHENE OR THE TETRACHLOROETHENE DEGRADATION SUITE (TCE, DCE, OR VINYL CHLORIDE)

SOURCE AREA

NOTE:
1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

300 0 300 600

1" = 300'

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

SOLUTIA INC. QUEENY PLANT ST. LOUIS, MISSOURI	PROJECT NO. 2320000058.00
URS	
DRN. BY: chs 11/16/00 DSGN BY: tjo CHKD BY:	Composite Plumes– of the Sand
FIG NO	28

Appendix G

SAP Work Sheet

GROUNDWATER SAMPLING AND ANALYSIS PLAN (SAP) WORKSHEET (1 OF 3)
Prepared by MDNR Hazardous Waste Program
Version of September 30, 1993

Facility Name and Address: SOLUTIA - QUEENY PLANT
ST LOUIS, MO

Date of SAP evaluation: 8-14-2000
Person performing evaluation: Ron Murphy, PE
Date and source of SAP evaluated: DATA GAP WORK PLAN - 7/99

I. Review of Groundwater Sampling & Analysis Plan (SAP)

	Y/N/NA
1. Does the SAP specify that the following field data be measured and recorded (field logbook or sample sheets) during each sampling event:	
a) Water level (each sampling event)?	✓
b) Total well depth (at least annually)?	✓
c) Weather (temp, general atmospheric conditions)?	✓
d) Physical condition of well?	✓
e) Sampling team members?	✓
f) Well number, date and time of sampling?	✓
g) Physical description of well area?	✓
h) Instrument calibration information (before and after)?	✓
i) Actual well purge volume and calculations?	✓
j) Presence/thickness of any immiscible layers present?	✓
k) Any deviations from planned sampling methodology?	✓
2. For well purging does the SAP specify:	
a) Purging technique ?	✓
b) Type/composition of equipment (manufacturer, model)?	✓
c) Dedicated equipment?	
d) Non-dedicated equipment?	
e) Decontamination procedures for non-dedicated equipment?	
f) Volume to purge (generic)?	✓
g) Method of calculation of purge volume?	✓
h) Use of stabilized field parameters (pH, temp, Sp Cond, Eh) to determine when purging is complete?	✓
i) Method to prevent purge equip contact with contaminated surfaces?	NO
j) Manner of disposal of purged fluids?	✓
3. For well sampling does the SAP specify:	
a) Sampling technique (gentle bailer lowering, bottom discharge for volatiles, pump rates, etc.)?	✓
b) Type/composition of equipment (manufacturer, model)?	
c) Dedicated equipment?	
d) Non-dedicated equipment?	
e) Decontamination procedures for non-dedicated equipment?	✓
f) Dry well contingency plan for persistently dry wells?	✓

3. (con't): **Y/N/NA**

g) Sampling protocol for low yield wells?
h) Sampling protocol for high yield wells?
i) Immiscible phase detection methods?
j) Immiscible phase sampling methods?
k) Pump and/or bailer intake level (generally)?
l) Pump rate (non-volatilization of sensitive parameters)?
m) Sampling order according to parameter volatilization potential?

4. In relation to the monitored parameters does the SAP specify:

a) Parameters required by regulation (detection)?
b) Waste-specific parameters (assessment)?

5. In sampling for site-specific parameters does the SAP specify:

a) Specific container/cap type for each parameter?
b) Volume of each type of sample container?
c) Parameter specific preservative method (chemical and/or cooling)?
d) Maximum parameter-specific holding time?
e) Sample container labeling requirements?
f) Method of packaging & shipment (coolers, blue ice, carrier, etc.)?

6. In relation to field and laboratory QA/QC does the SAP specify:

a) General QA/QC procedures?
b) The use and frequency of trip blanks (e.g., 1 trip blank per container type)?
c) Trip blank preparation protocol?
d) The use and frequency of equipment blanks where non-dedicated samplers are used (e.g., one per non-dedicated sampling equip type)?
e) Equipment blank preparation protocol?
f) The use and frequency of duplicate samples (e.g., 5-10% of total samples)?
g) The use and frequency of spiked samples as an indicator of analytical performance or cross-contamination?
h) Spike sample preparation protocol?
i) Replicate parameter sampling protocol (e.g., pH, Sp Cond, TOX, TOC)?
j) Split/duplicate sampling protocol?
k) Calibration frequency for field and laboratory analytical equipment?
l) Verification & reporting of analytical data (% recoveries for spiked samples, analytical detection limits, raw analytical data and calculations, etc.)?

7. In relation to contaminated equipment does the SAP discuss:

a) Decontamination of field equipment other than that used for purging or sampling (e.g., analytical instrument probes, depth measuring devices, etc.)?
b) Decontamination of laboratory equipment (e.g., sample bottles, sample analysis equipment, contaminated sample shipment containers)?
c) Disposal of potentially contaminated sampling equipment and clothing (e.g., glassware, plasticware, sample coolers containing broken sample bottles, gloves, coveralls, etc.)?

8. Does the SAP discuss sample Chain-of-Custody (COC) including: **Y/N/NA**

   a) Field and laboratory COC procedures? ✓
   b) Disposition of samples?
   c) COC sample forms?

9. Does the SAP include a Health and Safety Plan (HSP) that discusses:

   a) Required level of personal protection? Level D ✓
   b) Required or recommended personal protective/monitoring equipment? PID ✓
   c) Use of a photo-ionization detector or HNU meter to check the wellbore headspace prior to sampling in wells known or suspected of being contaminated with volatile organics ? ✓
   d) Special sample handling requirements? ✓
   e) Periodic medical monitoring for site personnel? ✓
   f) A field emergency contingency plan? ✓
   g) The telephone numbers and location of emergency facilities? ✓
   h) Field personnel training requirements/documentation? ✓
   i) Physical/chemicals hazards discussion? ✓

10. Does the SAP specify routine well inspection and maintenance procedures including:

   a) Inspection and documentation of the condition of all visible components of each monitoring well (See O&M Worksheet 3 of 3) during each groundwater elevation measurement/sampling event? ✓
   b) A copy of the well inspection worksheet used to document the above inspections?
   c) Contingencies for well repair/replacement within a reasonable time frame should the well integrity inspection reveal damage?
   d) A contingency for inspection of wells contacted by flood waters as soon as such waters recede enough to perform such inspection?
   e) Measurement of total depth to $\pm 0.1'$ in each well at least annually? ✓
   f) Comparison of total versus as-built depths for each well at least annually to assess the degree of well screen occlusion?
   g) A well redevelopment trigger criterion (e.g., 5-10% of screen) as based on the degree of well screen occlusion/contaminants of concern including a general time frame for such redevelopment? ✓
   h) Other procedures for periodically assessing subsurface casing integrity (e.g., gauge ring, caliper logs, downwell video logging) including provisions for repair/replacement of wells if indicated?

11. Additional comments pertaining to the Sampling & Analysis Plan:

[illegible]

Appendix H

ESP Sampling Audit

RCRA OPERATION & MAINTENANCE (O & M)
GROUNDWATER MONITORING
FIELD AUDIT REPORT

Solutia Queeny Plant
St. Louis, Mo

June 14-15 & 29, 2000

Prepared For:

Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

Prepared By:

Missouri Department of Natural Resources
Division of Environmental Quality
Environmental Services Program

Table of Contents

1.0 Introduction

The Missouri Department of Natural Resources (MDNR), Hazardous Waste Program (HWP), requested the MDNR, Environmental Services Program (ESP), to conduct a groundwater monitoring field audit at the Solutia Queeny Plant (hereafter, Solutia) located in St. Louis, Missouri. The field audit was conducted on June 14-15, 2000, as part of the MDNR's agreement with the U.S. Environmental Protection Agency (EPA) to conduct Groundwater Compliance Monitoring Program inspections at Resource Conservation and Recovery Act (RCRA) regulated facilities.

The equipment and methods used by the facility sampling team for the collection of groundwater samples were observed and critiqued by Larry Lehman, Environmental Specialist with the ESP. Furthermore, the ESP collected split groundwater samples for independent analyses by the state. The facility sampling team consisted of Eric Page, Project Geologist, and Matthew Foresman, Staff Engineer, both of URS Greiner Woodward Clyde. Jim Barker and Eric VanEck, Robert's Environmental Drilling (subcontractors with URS Greiner Woodward Clyde), were also present.

Samples collected by the facility sampling team were sent to STL Savannah Laboratories, Savannah, Georgia, for analyses. Kurt Hollman, Geologist with the MDNR's Division of Geology and Land Survey (DGLS), was on-site to evaluate monitoring well conditions, record well depth measurements, photograph each monitoring well, and observe well evacuation procedures. MDNR, HWP Environmental Engineer Rob Murphy and James Dunajcik, Tetra Tech EM Inc. (contracted with the EPA), were present to observe the sampling event. Additional split samples were collected by ESP staff on June 29, 2000.

2.0 Site Description and History

2.1 Site Location

The Solutia facility is located at 1700 S. 2nd Street, St. Louis, Missouri. This site can also be located at the following geographic coordinates: latitude 38.607808, and longitude −90.197063.

2.2 Site Description

The Solutia facility encompasses approximately 56 acres surrounded by an 8-foot high fence. The area consists of primarily concrete, asphalt, and compacted crushed stone. Most of the production facilities have been dismantled and removed from the property. The site is located in a heavily industrialized area. Other industries are located on the northern and southern boundaries of the Solutia facility. The Mississippi River is located on the east side of the facility (approximately 500-800 feet from the property line) and commercial properties, parking lots, and vacant land are located to the west.

2.3 Site History/Contaminants of Concern

Chemical manufacturing started at the plant in 1902. In the first 20 years, the facility produced organic chemicals such as saccharin, caffeine, vanillin, phenacetin, aspirin, acetanilide, phenolphthalein, and glycerophosphate. From 1902 to the 1970s, the facility has manufactured over 200 products in over 800 forms. Some of the major products include process chemicals (e.g. maleic anhydride, fumaric acid, and toluene sulfonic acid), synthetic functional fluids (e.g. Pydrauls™ and Skydrols™), food and fine chemicals (e.g. salicylic acid, methyl salicylate and aspirin), and agricultural chemicals (e.g. Lasso™).

Production activities and facilities at the site began to decrease in the 1970s as the result of sales and consolidations. Some of the current manufacturing activities at the site include, L-aspartic acid (nonessential amino acid used in artificial sweeteners) and Duralink™. Solutia also operates as a central liquid handling facility for Skydrol™.

3.0 Methods

3.1 Field Procedures

The procedures used by the facility sampling personnel for the collection of groundwater samples were documented in a worksheet that is attached to this report as Appendix A. The field procedures are summarized below. The field audit conducted by the ESP included the collection of split groundwater samples for independent analyses at the State Environmental Laboratory within the ESP. ESP personnel collected split samples from monitoring wells GM-1 and MW-3 on June 14, 2000, MW-13 on June 15, 2000, and HW-1B and MW-8A on June 29, 2000.

The ESP field person observed that the evacuation of the well water was accomplished utilizing a "Dull Tube Air Lift Developer" on all wells except for monitoring well GM-1. The facility sampling personnel could not insert the "Dull Tube Air Lift Developer" through the riser to the depth of the water. Therefore, the well was evacuated utilizing a bailer. The sample collection of well water was accomplished through the use of dedicated, 3-foot polyvinyl chloride bailers with nylon cord.

The facility sampling personnel followed standard well evacuation procedures. Static water levels were measured and used to calculate well volumes. Well evacuation continued until the water quality parameters (temperature, specific conductance, and pH) stabilized according to the September 24, 1999 O'Brien & Gere, Inc. Field Sampling Plan. The amount of water purged was measured by estimating the amount pumped into a portable storage tank.

All the purged water is stored at the facility in holding tanks pending analytical results for disposal (via the St. Louis Metropolitan Sewer District if permitted). Water quality parameters (temperature, specific conductance, pH, dissolved oxygen, and turbidity) were measured at the time of sample collection. Facility samples were collected for the analyses of volatile organics, pesticides, cyanide, sulfide, dissolved metals, PCBs, and base neutrals/acid extractables.

The groundwater split samples collected by the ESP personnel are summarized in the table below.

SAMPLE NUMBER	SAMPLE LOCATION	ANALYSES REQUESTED	PRESERVATIVE
0004549	Monitoring Well GM-1	VOA BNAs Pesticides	HCL & Ice None & Ice None & ice
0004550	Monitoring Well MW-3	VOA BNAs	HCL & Ice None & Ice
0004551	Monitoring Well MW-3 (Duplicate)	VOA BNAs	HCL & Ice None & Ice
0004552	Monitoring Well MW-13	VOA BNAs	HCL & Ice None & Ice
0004553	Trip Blank	VOA BNAs Pesticides	HCL & Ice None & Ice None & Ice
0001870	Monitoring Well HW-1B	VOA	HCL & Ice
0001871	Monitoring Well MW-8A	VOA BNAs	HCL & Ice None & Ice
0001872	Trip Blank	VOA BNAs	HCL & Ice None & Ice

3.2 Chain-of-Custody

All samples received a numbered label and were placed on ice in a cooler. The corresponding label number was entered onto a chain-of-custody form indicating the location, date and time of collection, and parameters to be analyzed. Custody of the samples was maintained by the ESP field person until relinquishing them to a sample custodian with the ESP in Jefferson City for analyses.

3.3 Analyses Requested

The state's samples were submitted for the analyses as identified in the table above.

3.4 Quality Assurance/Quality Control (QA/QC)

All samples were analyzed in accordance with the general requirements and standard operating procedures of the Fiscal Year 2000 Generator/TSD Quality Assurance Project Plan.

Sample 0004551 was collected as a duplicate to sample 0004550 from monitoring well MW-3. Samples 0004553 and 0001872 were trip blanks that were prepared prior to departure from the ESP. Sample 0004533 accompanied samples 0004549 through 0004552. Sample 0001872 accompanied samples 0001870 and 0001871.

4.0 Investigation Derived Wastes

All of the personal protective equipment and spent disposable sampling equipment generated by the ESP were containerized and properly disposed of at the State Environmental Laboratory in Jefferson City.

5.0 Observations

The weather on June 14, 2000, was overcast with periodic thundershowers and approximately 80 degrees Fahrenheit. The weather on June 15, 2000, was sunny and approximately 75 degrees Fahrenheit. The weather on June 29, 2000, was sunny and approximately 80 degrees Fahrenheit.

On June 23, 2000, Mr. Mike House, Solutia's sampling investigation contact, reported to MDNR ESP that the facility samples, collected and split with MDNR on June 14-15, 2000, were temporarily lost by Federal Express during the shipping process. He explained that when the samples arrived at STL Savannah Laboratories, the samples were deemed invalid. Therefore, MDNR ESP collected additional split samples with the facility on June 29, 2000.

The sampling equipment and methods used by the facility sampling personnel were observed in the field and critiqued by the ESP (Appendix A). A summary of the more significant observations is provided below.

The groundwater was purged in the following manner. The Dull Tube Air Lift Developer consisted of a black air hose connected to a valve at the end of a PVC pipe. The valve was inserted into the water column of the monitoring well to the appropriate depth. Segments of PVC pipe were attached together to achieve the appropriate depth. Air is forced through the air hose via a portable gasoline operated air tank system. The forced air makes a 180 degree turn in the above referenced valve and then travels back up through the PVC pipe. A vacuum is generated in the valve drawing the water up through the PVC pipe. The top of the PVC pipe has a rubber hose attachment leading to a portable holding tank that the purged water is pumped into.

On June 14, 2000, ESP staff observed that the facility sampling personnel filled the sample containers for the analyses of alachlor, cyanide, and sulfide, and for tests associated with natural attenuation prior to filling the sample containers for the analysis of volatile organics while sampling monitoring well GM-1. The September 24, 1999 "Resource Conservation and Recovery Act Facility Investigation Data Gap Work Plan", hereafter Work Plan, notes that the sampling procedure will be to "Fill sample containers for VOC samples prior to filling other sample containers." The United States Environmental Protection Agency RCRA Groundwater Monitoring Technical Guidance document notes that "Samples should be collected and containerized according to the volatility of the target analytes. The preferred collection order for some of the more common groundwater analytes is as follows: 1) Volatile organics (VOAs or VOCs) and total organic halogens (TOX); 2) Dissolved gases and total organic carbon (TOC); 3) Semivolatile organics (SMVs or SVOCs); 4) Metals and cyanide; 5) Major water quality cations and anions; and 6) Radionuclides."

During the well purging process on monitoring well HW-1B, the ESP field person observed that the black air hose (part of the Dull Tube Air Lift Developer) had come in contact with the ground prior to inserting the hose into the well. Facility sampling personnel should avoid placing equipment on the ground or other potentially contaminated surfaces prior to use.

During the sampling event, the ESP field person observed that the facility sampling personnel collected trip blanks for the analysis of volatile organics and no other parameters. Per the MDNR Division of Environmental Quality Standard Operating Procedures #MDNR-FSS-001, trip blanks are also collected for the analyses of base neutrals/acid extractables, pesticides, and PCBs when those parameters are analyzed for samples collected.

6.0 Data Reporting

Please refer to Appendix B for analytical results of samples collected.

Submitted by: Larry Lehman
Larry Lehman
Environmental Specialist
Superfund/RCRA Unit
Environmental Services Program

Date: 8/4/2000

Approved by: James H. Long
James H. Long
Director
Environmental Services Program

JB:ch

c: Rob Murphy, Environmental Engineer, HWP

APPENDIX A

Sampling and Analysis Procedures Worksheet

Solutia Queeny Plant
St. Louis, Missouri
June 14-15 & 29, 2000

RCRA Operation and Maintenance (O & M) Field Audit

Sampling and Analysis Procedures Worksheet
Prepared by the MDNR Environmental Services Program

Facility Name and Address: Solutia Queeny Plant
1700 S. 2nd Street
St. Louis, MO 63177-7040

Date(s) of Sampling: June 14, 15, & 29, 2000

Lab Name and Address: STL Savannah Laboratories
5102 LaRoche Avenue
Savannah, Georgia 31404

Participants:

Name	Position	Representing
Larry Lehman	Environmental Specialist	MDNR-DEQ-ESP
Kurt Hollman	Geologist	MDNR-DGLS
Rob Murphy	Environmental Engineer	MDNR-DEQ-HWP
Rich Koening	Environmenal Technician	Solutia Queeny Plant
James Dunajcik	Engineer	Tetra Tech EM Inc.
Matthew Foresman	Staff Engineer	URS Greiner Woodward Clyde
Eric Page	Project Geologist	URS Greiner Woodward Clyde
Jim Barker	Field Technician	Roberts Environmental Drilling
Eric VanEck	Field Technician	Roberts Environmental Drilling

I. Review of Sampling and Analysis Procedures Y/N/NA

1. Prior to Well Evacuation (ESP use only if DGLS has not evaluated):

   a. Are the well numbers clearly marked on the well? ______
   If yes, how are they marked and where? DGLS evaluated all of the items in section 1.

   b. Were measures taken to prevent evacuation/sampling equipment from contacting potentially contaminated surfaces? ______
   If yes, what measures? ______

c. Were static water levels measured? ______

d. Were total well depths measured? ______

e. Are measurements taken to the nearest 0.01 feet? ______

f. Is there a permanent depth measurement reference point at each well? ______
If yes, where is this point located? ______________________________

____

g. Description of depth measuring device used (type, manufacturer, model):

____

h. Was depth measuring device cleaned and dried after each measurement? ______
If yes, describe decontamination procedure: ______________________________

____

2. Detection/Sampling of Immiscible Layers (ESP use only if DGLS has not evaluated):

a. Are procedures used which will detect light phase immiscible layers? ______
If yes, describe: DGLS evaluated all of the items in section 2.

____

b. Are procedures used which will detect dense phase immiscible layers? ______
If yes, describe: ______________________________

____

c. Are any detected immiscible layers sampled separately prior to well evacuation? ______
If yes, describe the procedure: ______________________________

____

d. Do the procedures used minimize mixing with the aqueous phase? ______

3. Well Evacuation (ESP use only if DGLS has not evaluated):

a. Are low yielding wells evacuated to dryness? ______
DGLS evaluated all of the items in section 3.

b. Are high yielding wells evacuated until the parameters of pH, temperature, and specific conductance have stabilized to $\pm$ 10% over two successive well purge volumes? ______

c. If no to b, are at least three well casing volumes purged from high yielding wells? ______

d. Describe field method used to calculate the volume of evacuated water:

______

______

e. Describe field method used to measure the volume of evacuated water:

______

f. Describe procedure used for collection, management, and disposal of evacuated Water: ______

______

g. Does each well have dedicated evacuation equipment? ______

h. Describe well evacuation equipment (type, composition, manufacturer, model, etc.) Including delivery lines use to lower equipment into well:

______

______

i. Describe the decontamination procedure used for non-dedicated evacuation Equipment: ______

______

j. Describe the physical properties of the evacuated water:

Well Number				
Color				
Odor				
Oil/Grease				
Turbidity				

4. Sample Withdrawal:

a. In what sequence were the wells sampled? The wells were sampled in the following order, from first to last: GM-1, MW-3, MW-13, HW-1B, and MW-8A.

b. Were wellbore fluid levels checked in low yield wells prior to sample collection to determine if sufficient fluid was available to sample for the parameters of concern? NA
All wells sampled were high yield wells.

c. Were low yield wells sampled as soon as sufficient wellbore fluid volume was available? NA

d. For low yield wells, on average how much time elapsed between well purging and sampling? NA

e. Were wellbore fluid levels checked in high yield wells prior to sample collection to determine the percent recovery of wellbore fluids? N
The wellbore fluid levels were checked, however, the percent recovery was not determined.

f. According to the facility's sampling personnel, approximately what percent fluid recovery is deemed adequate prior to sampling high yield wells?
The facility sampling personnel don't have an established percent fluid recovery figure that is used in sampling protocol. They sample each well immediately after purging.

g. Were high yield wells allowed to achieve this percent recovery prior to sample collection? As previously discussed, the facility did not have an established percent recovery figure.

h. For high yield wells, on average how much time elapsed between well purging and sampling? High yield wells were sampled immediately after purging.

i. Describe well sampling equipment (type, composition, manufacturer, model, etc.) including delivery lines used to lower equipment into the well:
Clean, disposable, dedicated 3' polyvinyl chloride bailers were used in conjunction with nylon rope.

j. Does each well have a dedicated sampling device? Y

k. If no to j, is non-dedicated equipment decontaminated between wells? NA

l. Describe the decontamination procedure used for non-dedicated sampling equipment: All of the sampling equipment used by the facility was dedicated.

m. Is non-dedicated sampling equipment thoroughly dried before each use? NA

n. For non-dedicated sampling equipment, were equipment blanks collected to monitor for potential sample cross-contamination? NA

o. If yes to n, how frequently were equipment blanks collected? NA

p. Describe the procedure used to collect equipment blanks: NA

q. Were duplicate samples collected? Y

r. If yes to q, how frequently are duplicate samples collected? Facility sampling personnel stated that a duplicate sample is collected for every 10 samples collected during the sampling event.

s. Describe the duplicate sampling procedures: The true sample containers were filled first, then the duplicate containers were filled with the same bailer.

t. Was care taken to avoid placing clean sampling equipment on the ground or other potentially contaminated surface prior to use? Y

u. If bailers were used, were they lowered and raised slowly enough to prevent sample degassing or volatilization of sensitive parameters? Y

v. If volatile organics were sampled with a pump, was the sample collection pump rate at or below 100 ml/minute? NA

w. If no to v, what was the sample collection pump rate? NA

x. Were samples transferred directly from the sampling device to the sample containers? Y

y. Describe the sample transfer procedure: The groundwater was transferred into the sample containers by draining the groundwater from the bottom of the bailer with an emptying device.

z. Describe the method used to obtain split samples: The state's sample containers were filled prior to the facility's sample containers. This method was done for each parameter collected for analysis.

aa. Overall, were samples collected in a manner which would minimize changes in the sample due to adsorption, aeration, agitation, volatilization, etc.? Y

bb. If no to aa, describe any potential problems observed: NA

cc. Were samples collected and containerized in the order of site-specific parameter's Volatilization sensitivity (e.g., in descending order – VOA, TOX, TOC, semi-volatiles, metals and cyanide, major water quality cations and anions, Radionuclides)? N
For well GM-1, the facility's sample containers for the analysis of VOA were not collected first. Containers for the analyses of alachlor, cyanide, sulfide, and natural attenuation parameters were collected first.

dd. Were samples collected for dissolved metals? Y

ee. If yes to dd, were the samples field filtered using a 0.45 micron filter? Y

ff. If yes to dd, but no to ee, please explain: NA

gg. List any parameters measured in the field by the facility: The facility sampling personnel measured pH, temperature, specific conductance, redox, dissolved oxygen, and turbidity.

hh. Describe the equipment (type, manufacturer, model) used by the facility for taking field measurements:

PH	Horiba Model U-22
Temperature	Horiba Model U-22
Conductivity	Horiba Model U-22
Turbidity	Horiba Model U-22
dissolved oxygen	Horiba Model U-22

ii. List the values for any field measurements taken by the facility:

Well number	GM-1	MW-3	MW-13	HW-1B	MW-8A
PH	6.18	6.61	7.16	6.79	6.53
Temperature ° C	19.6	18.6	17.2	18.3	20.3
Conductivity in mS/cm	2.09	8.09	3.69	1.56	1.73

jj. Describe all field equipment calibration and maintenance procedures: The facility sampling personnel utilized "Auto Cal Solution" distributed by HAZCO Services – Inc. The solution consist of a 4.00 pH standard, 0.0 NTU turbidity standard, and a 4.49 mS/cm conductivity standard. The Horiba instrument was calibrated two times a day, once in the morning and once in the afternoon.

kk. Are the procedures under jj performed pursuant to the manufacturer's Recommendations and consistent with accepted protocol (e.g., SW-846)? Y

ll. Is a field logbook and/or individual well sampling sheets maintained? Y
If yes, which one is used? Both are used.

Are the following items documented in either or both of the above:

Date and time of sampling?	Y
Weather conditions?	Y
Field sampling participants?	Y
Observations and physical well integrity?	Y
Field equipment descriptions?	Y
Field analysis results?	Y
Field equipment and calibration/maintenance information?	Y
Any other pertinent field observations or unusual conditions?	Y

mm. Who maintains the field log book/well sampling sheets? Matthew Foresman

nn. Describe the physical properties of the groundwater samples:

Well number	GM-1	MW-3	MW-13	HW-1B	MW-8A
Color	Brown	Brown	Black	Light Brown	Brown
Oil/Grease	None	None	None	None	None
Turbidity	Moderate	Moderate	Moderate	Slight	Moderate
Odor	Solvent	None	Unidentified Odor	None	Unidentified Odor

5. Sample Preparation and Handling:

a. List the sample containers and preservation methods used by the facility for each : parameter or group of parameters to be analyzed:

Parameter/Group	Sample Container	Preservation
Volatile Organics	3, 40 ml glass vials	Hydrochloric Acid
Alachlor	2, 1 liter amber glass jars	None
Cyanide	1, 250 ml plastic container	Sodium Hydroxide
Sulfide	1, 500 ml plastic container	Zinc Acetate
Metals	1, 250 ml plastic container	Nitric Acid
Metals (Dissolved)	1, 250 ml plastic container	None
PCBs	2, 1 liter amber glass jars	None
Base Neutrals/Acid Extractables	2, 1 liter amber glass jars	None

b. Were the sample containers utilized for specific parameters consistent with current guidance (e.g., SW-846)? Y

c. Were any of the sample containers pre-cleaned prior to use (i.e., solvent-rinsed, baked, etc.) The contract lab used by the facility for sample analyses provided the pre-preserved, certified clean sample containers.

d. Were the samples preserved in accordance with current EPA-approved procedures? Y

e. If any non-EPA preservation methods were used, list the source(s) from which these methods were derived: NA

f. Were sample containers pre-preserved or were preservatives added in the field? The contract lab sent the sample containers pre-preserved.

g. Were the sample containers labeled? Y

h. Do the labels provide the following information:

Sample identification number?	Y
The well number was used as the sample identification number.	
Well number?	Y
Name of collector?	Y
Date and time of collection?	Y
Facility name?	Y
Parameter analyses requested?	N

i. Do the sample labels remain legible when wet? Y

j. Is a chain-of-custody record included with each sample? The facility sampling personnel produced the chain-of-custody in their field office at the end of the day as the samples were processed for shipping.

k. Does the chain-of-custody record document the following:

Sample identification number?	Y
Well number?	Y
Signature of collector?	Y
Date and time of collection?	Y
Sample container and preservative type?	Y
Number of containers?	Y
Parameter analyses requested?	Y
Signature of all persons involved in the chain-of-possession?	Y
Inclusive dates of possession?	Y

l. Was the headspace completely eliminated from containers used to collect samples for volatile organic analysis? Y

m. Is at least one trip blank prepared for each sample container type to verify sample container cleanliness and field handling methods? N
Trip blanks were collected on a daily basis for the sample containers used for the analysis of VOA. Trip blanks were not collected for sample containers used for the analysis of PCBs, pesticides, and base neutrals/acid extractables.

n. If no to m, were any trip blanks prepared? Y

o. If yes to m, in what containers and how many? The facility sampling personnel had one trip blank for each day of sampling. The trip blank was three 40 ml vials for the analysis of VOA.

p. What type of laboratory is used for the sample analysis (e.g., on-site in-house, off-site in-house, off-site contractor)? An off-site contract lab is used.

q. How are the samples maintained prior to analyses (i.e., refrigerated, secured, etc.)? The samples are kept secure in the custody of the sampling personnel on ice until shipped to the laboratory.

r. How long are the samples held prior to transport to the laboratory? The samples are shipped at the end of each day.

s. How are the samples transported/shipped to the laboratory (i.e., hand delivered, overnight express, etc.)? Samples are shipped overnight.

t. If the samples are not hand delivered, are sample seals attached to the containers or coolers to ensure that the samples are not tampered with while in transit? Y

6. Quality Assurance/Quality Control

In completing this portion of the O & M Field Audit checklist, the HWP feels that the auditor should contact the responsible laboratory directly for a response to the following questions, realizing that the resulting response must be taken as fact. This procedure is recommended since the O & M Field Audit is not intended as a laboratory audit, but the overall content of the report would not be complete without the answers to the following:

a. Are laboratory logbooks maintained to track all phases of laboratory procedure from sample receipt through analysis, reporting and disposition? Y

b. Do the logbooks document the following:

Client name? Y
Date and time of sample receipt? Y
Sample number and analysis to be performed? Y

Observation of damaged/irregular samples received?	Y
Sample preparation methods (e.g. extraction)?	Y
Date and time of sample analysis initiation and completion?	Y
Name of person performing each analytical step?	Y
All QA/QC sample results?	Y
Instrument calibration information?	Y

c Describe all procedures used to ensure integrity of the samples in the laboratory prior to analysis: STL Savannah is a secured facility that uses card access to enter the building. Samples are stored in secure card access walk-in coolers.

d Are all samples analyzed within EPA-specified holding times (e.g. SW-846)? N
All efforts are made to analyze samples within the holding times, occasionally this is not possible.

e. If no to d, are holding time overruns reported on the final analysis results sheets? Y

f. Are all samples analyzed using an EPA-approved analytical method for each parameter? Y

g. Is the analytical method used for each parameter documented? Y

h. If a new analytical method is used, is it documented, with split samples analyzed using the old method for comparison purposes? Y

i. If any non-EPA analytical methods are commonly used, list the method(s) and their source document(s): NA

j. For replicate analyses (e.g., TOC, TOX), describe the lab method used to obtain the individual concentration values: NA

k. Are appropriate QA/QC measures used in laboratory analyses (e.g., blanks, matrix spikes, standards, etc.)? Y

l. Are detection limits and percent recovery for matrix spikes or controls reported for each sample parameter? Y
Completed upon client request.

APPENDIX B

Analytical Results

Solutia Queeny Plant
St. Louis, Missouri
June 14-15 & 29, 2000

Appendix I

DGLS Well Integrity Inspection

RECEIVED

AUG 31 2000

FILE: Solutia, Queeny Plant
St. Louis County

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGY AND LAND SURVEY
P.O. Box 250 111 Fairgrounds Rd. Rolla, MO 65402-0250
(573) 368-2100
FAX (573) 368-2111

STATE OF MISSOURI
KURT R. HOLLMAN
RG0331
REGISTERED GEOLOGIST
8/28/2000

MEMORANDUM

DATE: August 28, 2000

TO: Rob Murphy, Environmental Engineer, Groundwater Unit, Permits Section, Hazardous Waste Program, DEQ

FROM: Kurt Hollman, Geologist, Environmental Geology Section, Geological Survey Program, DGLS

SUBJECT: Solutia - Queeny Plant O& M Inspection

LOCATION: N ½, NE ¼, SE ¼, Section 26, T. 54 N., R. 7 E.,
Cahokia Quadrangle, St. Louis County, Missouri
Latitude 38° 36' 34" North, Longitude 90° 11' 40" West

On June 14 and 15, 2000 an inspection of the monitoring well network and water level measuring procedure was performed at the Solutia Inc., Queeny chemical plant in St. Louis, Missouri. Forty-four monitoring wells were inspected for physical integrity with regard to surface seals, inner and outer casings and general well condition. The static water level and total well depth measurements were audited in two monitoring wells. Purging and sampling took place on the same days with personnel from the Environmental Services Program present.

There are several different types of monitoring wells used at the Solutia facility. The condition of the monitoring wells varied from good to severely deficient. The flush mount completions appeared to be of recent construction and in the best condition. The above ground completions had a number of deficiencies. Eight wells had broken, lifted or cracked surface seals. Thirteen wells had no apparent surface well seal. These wells either lacked a permanent surface seal or had them buried beneath soil or debris. At OBW-1, what appeared to be filter sand filled the annulus between the monitoring well protective casing and the surrounding asphalt parking lot. Monitoring wells MW-1 and MW-2, located outside the Solutia property, are in an area covered by coal tailings and do not have a surface well seal. A small hole exists at the base of HW-1, which appears to have been collecting water.

Nine of the monitoring wells lacked sufficient collision protection. Collision protection is especially needed in areas of on-going construction or busy parking lots. The damaged bumper post at well MW-18B is testament as to the need for collision protection at this site. The bumper post at MW-18 is leaning against the protective casing of the well and needs to be repaired.

None of the protective well casings at the site were protected with weep holes. Standing water was found inside the annulus of MW-11B. Weep holes drain water that can accumulate within the well annulus, cause corrosion, and shorten the useful life of the monitoring well.

Not all of the wells had a permanent depth-measurement reference point. Some wells had a black marker at the top of riser to indicate the measurement reference point. Other wells were measured from the lock side of the riser.

More careful attention needs to be paid to securing monitoring wells. MW-3 was found unlocked. The PVC screw cap at HW-1B was found to have been placed upside down. Monitoring wells MW-11A, MW-11C and MW-3 lacked PVC screw caps.

The static water level and total well depth measurement audit showed close agreement between the consultants for Solutia, URS Greiner Woodward Clyde, and the Geological Survey Program (GSP). On average GSP measured water levels 0.02 feet deeper than Solutia. On average the GSP measured total well depths 0.08 feet shallower than Solutia. Most discrepancies in measurement values may be attributed to small differences in measuring technique and /or equipment calibration. The small average differences in measurements convince me that accurate water levels are being collected during regularly scheduled sampling periods.

Groundwater purging was accomplished by use of a homemade air lift system designed by Dave Goto. Purge water was collected in a 200 gal. tank. The tank used for the collection of purge water did not appear to have calibration markings to denote the volume of water collected. The volume of water purged was estimated.

If you have any questions I can be reached by calling (573) 368-2129.

KH/lh

MEASUREMENT, PURGING AND WELL INTEGRITY WORKSHEET (3 OF 3)
Prepared by MDNR Division of Geology and Land Survey

Facility Name and Address: **Solutia Queeny Plant**
1700 S. 2nd Street
St. Louis, Missouri 63177

Date of Inspection: June 14-15, 2000

Participants:

Name	Position	Representing
Kurt Hollman	Geologist	MDNR/DGLS
Larry Lehman	Environmental Specialist	MDNR/ESP
Matt Foresman	Staff Engineer	URS Greiner Woodward Clyde
Richard Koening	Environmental Technician	Solutia
Jim Dunajcik	Geologic Engineer	Tetra Tech

I. Review of Measurement and Purging Procedures

1. Prior to Well Purging — Y/N/NA

a) Are the well numbers clearly marked on the well? No
If yes, how and where: A few labeled with a black marker
b) Were measures taken to prevent evacuation/sampling equipment from contacting potentially contaminated surfaces? Yes
If yes, what measures: Plastic on ground around well
c) Were static water levels measured? Yes
d) Were depths to bottom of the wells measured? Yes
e) Are measurements taken to the nearest 0.01 feet? Yes
f) Is there a permanent depth measurement reference point at each well? No
If yes, where is this point located: Black marker at top of riser
g) Description of depth measuring device used (type, manufacturer, model): Solinst model 122 interphase probe
h) Was depth measuring device cleaned and dried after each measurement? Yes
If yes, describe procedure. Yes, DI water spray and Alconox wash.
i) Record any well audit measurements made below:

	DGLS		Facility	
Well #	Depth to Water	Depth to Well Btm	Depth to Water	Depth to Well Btm
GM – 1	9.30	13.35	9.30	13.37
MW – 3	14.30	31.76	14.25	31.90

2. Detection and Sampling of Immiscible Layers **Y/N/NA**

a) Are procedures used which will detect light phase immiscible layers? Yes
If yes, describe: Interphase probe (Solinst) mod. 122

b) Are procedures used which will detect dense phase immiscible layers? Yes
If yes, describe: __

c) Are any detected immiscible layers sampled separately prior to well evacuation? If yes, describe procedure: __ No

d) Do both procedures used minimize mixing with the aqueous phase? Yes

3. Well Evacuation

a) Are low yielding wells evacuated to dryness? Yes

b) Are high yielding wells evacuated until the well purging parameters of pH, temperature and specific conductance have stabilized to ±10% over two successive well purge volumes? Yes

c) If no to b, are at least three well casing volumes purged from high yielding wells? Yes

d) Describe field method used to calculate the volume of evacuated fluid:
Height of water column X 0.163 X 3 = volume to purge

e) Describe field method used to measure the volume of evacuated fluid:
200 gallon tank filled directly, then estimate volume collected

f) Describe field procedure for collection, management and disposal of evacuated fluid: 200 gallon takn filled, discharged to sewers via MSD permit.

g) If evacuated fluids are disposed of on the ground, how far from the wellbore are such fluids disposed: N/A

h) Does each well have dedicated evacuation equipment? No

i) Describe well evacuation equipment (type, composition, manufacturer, model, etc.) including delivery lines used to lower equipment into the well:
Air lift system developed by Dave Goto – a homemade purge system – Geotech disposal bailer to sample

j) Describe the decontamination procedure used for non-dedicated evacuation equipment: Steam cleaner for airlift system, Alconox wash

k) Describe the physical properties of the evacuated water:

Well No.	GM-1	MW-3						
Color	Brown	Gray/Brown						
Odor	Yes	No						
Oil/grease	No	No						
Turbidity	Heavy	Heavy						

II. Visual Well Integrity Inspection

1. For all wells inspected, describe the material type (e.g., concrete, soils, etc.) and condition (e.g., intact, cracked, broken, lifted, pulled-away, etc.) of the surface well seal (i.e., the material surrounding the well casing at the ground surface). Also describe the material type (e.g., PVC, steel) and condition (e.g., intact, cracked, broken, bent, lifted, etc.) of both the outer protective well casing and inner casing riser.

	Surface Well Seal		Outer Well Casing		Inner Well Casing	
Well #	**Type**	**Condition**	**Type**	**Condition**	**Type**	**Condition**
GM-1	Concrete	Intact	Steel	Intact	PVC	Intact
GM-2	Concrete	Intact	Steel	Intact	PVC	Intact
MW-14	Concrete	Severely broken	Steel	Intact	PVC	Intact
GM-3	Asphalt	Intact	Steel	Rusted	PVC	Intact
MW-4	Gravel	? Loose	Steel	Bent	PVC	Intact
MW-21R	Asphalt	Cracked	Steel	Intact	N/A	N/A
MW-3	Concrete	Intact	Steel	Intact	PVC	No Cap
OBW-2	Concrete	Cracked	Steel	Intact	PVC	Intact
OBW-1	Gravel	Loose	Steel	Intact	PVC	Intact
MW-2R	Soil	Loose	Steel	Intact	N/A	N/A
MW-2B	Soil	Loose	Steel	Intact	PVC	Intact
MW-2A	Soil	Loose	Steel	Intact	PVC	Intact
MW-18A	Concrete	Lifted	Steel	Intact	PVC	Intact
MW-18B	Concrete	Lifted	Steel	Intact	PVC	Intact
OBS-1	Asphalt	Intact	Steel	Intact	PVC	Intact
MW-7B	Asphalt	Intact	Steel	Intact	PVC	Intact
TW-1	Concrete	Small Cracks	Steel	Intact	N/A	N/A
MW-8A	Concrete	Intact	Steel	Intact	PVC	Intact
MW-8B	Concrete	Cracked	Steel	Intact	PVC	Intact
MW-8R	Concrete	Most Removed	Steel	Intact	PVC	Intact
MW-20	Asphalt	Intact	Steel	Intact	PVC	Intact
OBW-3	Concrete	Intact	Steel	Intact	PVC	Intact
MW-19	Gravel	Loose	Steel	Intact	PVC	Intact
MW-5	Asphalt	Intact	Steel	Intact	PVC	Intact
MW-9	Gravel	Intact	Steel	Intact	PVC	Intact
MW-10	Concrete	Severely broken	Steel	Intact	PVC	Intact
MW-13R	Concrete	Intact	Steel	Intact	PVC	Intact
QS-1	Gravel	Loose	Steel	Rusted	PVC	Intact
MW-11C	Gravel	Loose	Steel	Intact	PVC	No Cap
MW-11A	Gravel	Loose	Steel	Intact	PVC	No Cap
MW-11B	Concrete	Intact	Steel	Intact	PVC	Intact
REC- 4	Concrete	Cracked Corner	Flush	Intact	N/I	N/I

	Surface Well Seal		Outer Well Casing		Inner Well Casing	
Well #	**Type**	**Condition**	**Type**	**Condition**	**Type**	**Condition**
REC-3	Concrete	Intact	Flush	Intact	N/I	N/I
LPZ –3	Concrete	Intact	Flush	Intact	PVC	N/I
MW-15	Gravel	Loose	Steel	Rusted	PVC	Intact
HW-3	Gravel	Loose	Steel	Intact	PVC	Intact
HW-2	Soil/Gravel	Loose	Steel	Intact	PVC	Intact
HW-1B	Coal Trailings	Loose	Steel	Intact	PVC	Intact
HW-1	Grout	Shattered	Steel	Intact	PVC	Intact
VW-1	Gravel	Loose	Steel	Intact	PVC	Intact
VW-2B	Concrete	Intact	Steel	Intact	PVC	Intact
VW-2	Soil	Loose	Steel	Rusted	PVC	Intact

N/A -= Non Applicable
N/I = Not Inspected
AL = Aluminum

2. For all wells inspected, describe the physical properties of the surface well seal (i.e., approximate diameter (inches/feet), % coverage surrounding well casing, sloped away from wellbore to promote drainage (yes/no), water ponding (yes/no) or surface run-off flow (yes/no), evident around or near wellbore).

Surface Wells Seals					
Well #	**Diameter**	**% Coverage**	**Sloped?**	**Ponding?**	**Run-off?**
GM-1	1.5'	100	No	No	Yes
GM-2	1.5'	100	No	No	Yes
MW-14	1.5'	100	No	No	No
GM-3	Lot	100	Yes	No	Yes
MW-4	N/A	0	Yes	No	Yes
MW-21R	Lot	100	Yes	No	Yes
MW-3	2'X4'	100	No	No	Yes
OBW-2	2'	100	No	No	Yes
OBW-1	N/A	0	No	No	Yes
MW-2R	N/A	0	No	Yes	No
MW-2B	N/A	0	No	Yes	No
MW-2A	N/A	0	No	Yes	No
MW-18A	2'	100	Yes	No	Yes
MW-18B	2'	100	Yes	No	Yes
OBS-1	Lot	100	Yes	No	Yes
MW-7B	Lot	100	Yes	No	Yes
TW-1	Lot	100	Yes	No	Yes
MW-8A	3'X5'	100	No	No	Yes
MW-8B	1'	100	Yes	No	Yes
MW-8R	2'	10	No	Yes	Yes

Surface Wells Seals					
Well #	**Diameter**	**% Coverage**	**Sloped?**	**Ponding?**	**Run-off?**
MW-20	Lot	100	Yes	No	Yes
OBW-3	2'X2'	100	No	No	Yes
MW-19	N/A	0	No	No	Yes
MW-5	Lot	100	Yes	No	Yes
MW-9	N/A	0	Yes	No	Yes
MW-10	3'	50	Yes	No	Yes
MW-13R	1'	100	Yes	No	Yes
QS-1	N/A	N/A	Yes	No	Yes
MW-11C	N/A	N/A	No	No	Yes
MW-11A	N/A	N/A	No	No	Yes
MW-11B	2'	100	Yes	No	Yes
REC- 4	2.5' X 2.5'	100	Yes	No	Yes
REC-3	3'	100	No	No	Yes
LPZ –3	3'	100	Yes	No	Yes
MW-15	N/A	N/A	Yes	No	Yes
HW-3	N/A	N/A	Yes	No	Yes
HW-2	N/A	N/A	Yes	No	Yes
HW-1B	N/A	N/A	Yes	Yes	No
HW- 1	N/A	N/A	Yes	Yes	No
VW –1	N/A	N/A	Yes	No	Yes
VW – 2B	1.5'	100	No	No	Yes
VW-2	N/A	N/A	No	Yes	No

3. For all wells inspected, detail the following items related to the surface protective casing and well casing riser: 1) Protective casing cap type (e.g., screw-type, hinged), composition (e.g., PVC, steel), security configuration (i.e., locking, non-locking) and condition (i.e., intact, cracked); 2) Is there a drainage hole in the protector casing? (yes/no); Is it open? (yes/no); How far above ground level is the hole? (inches/feet); 3) Are protective posts installed around the well? (yes/no).

Accessory Well Information								
	Casing Cap				**Drainage Hole**			
Well #	**Type**	**Composit**	**Configur.**	**Condition**	**Hole?**	**Open?**	**Height**	**Posts?**
GM-1	Hinged	Steel	Locking	Intact	No	N/A	N/A	Along Street
GM-2	Hinged	Steel	Locking	Intact	No	N/A	N/A	Along Street
MW-14	Hinged	Steel	Locking	Intact	No	No	N/A	Yes
GM-3	Hinged	Steel	Locking	Intact	No	No	N/A	No
MW-4	Hinged	Steel	Locking	Intact	No	No	N/A	Yes
MW-21R	Geostore	AL	Locking	Intact	No	N/A	N/A	Yes
MW-3	Hinged	Steel	Locking	Intact	No	No	N/A	Yes
OBW-2	Hinged	Steel	Locking	Intact	No	No	N/A	No

Accessory Well Information								
	Casing Cap				Drainage Hole			
Well #	**Type**	**Composit.**	**Configur.**	**Condition**	**Hole?**	**Open?**	**Height**	**Posts?**
OBW-1	Hinged	Steel	Locking	Intact	No	N/A	N/A	No
MW-2R	Geostore	AL	Locking	Intact	No	N/A	N/A	Yes
MW-2B	Hinged	Steel	Locking	Intact	No	No	N/A	No
MW-2A	Hinged	Steel	Locking	Intact	No	No	N/A	No
MW-18A	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes (has been hit)
MW-18B	Hinged	Steel S	Locking	Intact	No	N/A	N/A	Yes
OBS-1	Oversize	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-7B	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
TW-1	Geostore	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-8A	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-8B	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-8R	Oversized	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-20	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
OBW-3	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-19	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-5	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-9	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-10	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-13R	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
QS-1	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-11C	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-11A	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-11B	Geostore	Al	Locking	Intact	No	N/A	N/A	Yes
REC- 4	Robco	Al	N/I	N/I	N/A	N/A	N/A	N/A
REC-3	Robco	Al	N/I	N/I	N/A	N/A	N/A	N/A
LPZ –3	Robco	Al	N/I	N/I	N/A	N/A	N/A	N/A
MW-15	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
HW-3	Hinged	Steel	Locking	Intact	No	N/A	N/A	No
HW-2	Hinged	Steel	Locking	Intact	No	N/A	N/A	No
HW-1B	Oversized	Steel	Locking	Intact	No	N/A	N/A	No
HW- 1	Hinged	Steel	Locking	Intact	No	N/A	N/A	No
VW –1	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
VW – 2B	Oversized	Steel	Locking	Intact	No	N/A	N/A	Yes
VW-2	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes

Solutia Site
St. Louis County Missouri

REGIONAL GEOLOGY

The Solutia facility is located on the southeastern edge of the City of St. Louis in St. Louis County, Missouri. The facility includes lands in N ½, NE ¼, SE ¼, Section 26, Township 45 N., Range 7 E. and S ½, SE ¼, NE ¼, Section 26, Township 45 N., Range 7 E.

St. Louis County is located along the southeastern boundary of the Dissected Till Plains physiographic region of the Central Lowlands province of Missouri. St. Louis County is situated at the southern most extent of glacial advance. The terrain consists of gently rolling hills with incised, well-dissected dendritic drainages. The region is bordered by the valleys of the two major river systems, the Missouri Rivers and the Mississippi, which are located on the northern and eastern boundaries of St. Louis County, respectively. Both of these major rivers drain the county either directly or via smaller tributaries.

Surfical materials in the St. Louis region consist of loess, residuum, glacial outwash, Glacial till and alluvium. Residuum is a clayey gravel deposit that forms by the direct weathering of the bedrock surface. Modified glacial outwash and glacial till overlie the eroded bedrock surface and form gently rolling hills. Alluvium fills the adjacent valley floodplains with gravel, sand and silty clay deposits. Loess, wind-deposited silt, was deposited and preserved on the uplands above the valley floor and form bluffs along the major rivers of the region.

Bedrock exposed in the St. Louis area is predominantly composed of Mississippian-age limestone and Pennsylvanian-age limestone, shale, clay and sandstone. These units were deposited over older sedimentary rock layers of the Cambrian, Ordovician, Silarian and Devonian periods. Precambrian-age granite has been encountered at depths ranging from 1500 to 3800 feet below the present ground surface.

The quantity of producible groundwater in the area varies with depth and location. Large amounts of fresh water are stored in the bedrock and alluvium, although the alluvial aquifers are generally more productive than the bedrock aquifers. Alluvial wells can produce water up to a rate of 1000 gallons per minute (gpm). Shallow bedrock wells, with completion depths less than 300 feet, generally yield 10 to 15 gpm. However, deeper bedrock wells, with completion depths deeper than 500 feet, can produce between 50 to 465 gallons per minute.

Groundwater quality varies greatly with depth and location. Shallow groundwater from wells completed in Pennsylvanian-age bedrock generally has a higher content of dissolved solids than groundwater from wells completed in alluvium or the deeper Mississippian, Ordovician and Cambrian bedrock. All shallow sources of groundwater are subject to pollution because of sinkholes, fractures and enlarged bedding planes that allow surface water to enter the shallow aquifers.

St. Louis is supplied with potable water through a metropolitan water district. Intakes for the water supply are located on the Mississippi River.

The structural geology of the St. Louis area is typified by relatively flat-lying sedimentary formations with a slight northeast regional dip. The bedrock has been strained into a series of low amplitude anticlines and synclines with a northwest-southeast trend. The gentle folds are modified by several short, normal faults with small amounts of displacement that offset Pennsylvanian-/and Mississippian-age formations.

Mature Karst topography has developed behind the bluffs of the major rivers where carbonates make up the bedrock just below the surface. Coalescing sinkhole fields, losing streams and an extensive cave network are all present in upland areas where the bedrock is composed of soluble Mississippian limestones. Karst features are not as prevalent beneath areas covered with relatively insoluble Pennsylvanian-age shales and clay. Sinkholes are common in the St. Louis area even though, in most cases, the surficial expression of these features has been masked by urban development.

Solutia Site
St. Louis County, Missouri

LOCAL GEOLOGY

The Solutia facility is located on lands within portions of N ½, NE ¼, SE ¼, Section 26, Township. 45 N, Range 7 E. and S ½, SE ¼ , NE ¼, Section 26, Township 45 N., Range 7 E., St. Louis County, Missouri.

The Solutia site is situated on the western bank of the Mississippi River flood plain. The topography is flat with a gentle rise to the west. Elevations across the site range from 400 feet mean sea level (msl) at the Mississippi River bank to 420 feet at the western boarder of the property.

Surface water drains directly to the Mississippi River via storm sewers.

Groundwater flow from the site is easterly, toward the Mississippi River. River level fluctuations are a major influence on the potentiometric surface of the alluvial aquifer at the site.

Surficial materials at the site are composed of fill over a series of floodplain deposits that consist of clayey silt, silty clay and an extensive thickness of fine sand. Floodplain deposits in this area may be up to 100 feet thick.

The approximate depths and thickness of bedrock formations can be interpolated from a sample log taken from an industrial, high-capacity well located ½ mile northwest of the Solutia site. Table 1 summarizes the stratigraphy and formation depths and thickness in the vicinity of the site.

The first competent bedrock below the site is the Mississippian-age St. Louis Limestone (90 feet thick). It is a very hard light yellow to grayish rock, mostly pure carbonate but may contain some gray, breccia beds and dolomite pseudoconcretions. The Salem Formation underlies the St. Louis Limestone. The Salem Formation (140 feet thick) is a white to blue-gray, argillaceous, locally oolitic, cross-bedded limestone. A distinctive "bulls-eye" chert nodule zone occurs near the top of the Salem Formation and indicates the approximate contact with the St. Louis Limestone. The Warsaw Formation underlies the Salem Formation. The Warsaw Formation (110 feet thick) is buff to gray, argillaceous limestone interbedded with green calcareous shale. The Burlington-Keokuk Limestone undifferentiated underlies the Warsaw Formation. The Burlington-Keokuk Limestone undifferentiated (155 feet thick) is coarse grained, white to brownish-gray, cherty, crinoidal, massive limestone. The Fern Glen

Formation underlies the Burlington-Keokuk Limestone undifferentiated. The Fern Glen Formation (60 feet thick) is a gray-green to red, fossiliferous, thickly bedded limestone with the upper portion of the formation being cherty. A thin red shale marks the bottom of the Fern Glen Formation. The undifferentiated Chouteau Group underlies the Fern Glen Formation and forms the basal unit of the Mississippian System. The Chouteau Group (40 feet thick) is made up of discontinuous limestone and rests unconformably on top of the Devonian System.

The Devonian System is represented by the thin presence of the Grassy Creek Shale. The Grassy Creek Shale (3 to 20 feet) is a gray-black, fissile, carbonaceous shale. The Grassy Creek Shale rests unconformably on the undifferentiated Silurian dolomites. The Silurian dolomites (40 to120 feet thick) are silty and contain some small amounts of chert.

The Silurian limestones rest unconformably on the Ordovician-age Maquoketa Shale. The Maquoketa Shale (140 feet thick) is a blue-gray, often calcareous, platy shale. Below the Maquoketa Shale are some 2860 feet of Cambrian and Ordovician-age limestones, dolomites and sandstones that comprise the Ozark Aquifer. The Maquoketa Shale forms an important upper confining unit for the underlying Ozark Aquifer.

Bedrock at the Solutia site dips gently to the east into the Illinois Basin. The St. Louis Fault is the nearest bedrock structure and is located 1.5 miles to the west. This vertical fault strikes N. 5° E. and has a net offset of 10 feet. The Solutia site is on the down-thrown side.

The axis of the Dupo Anticline lies 2 miles east of the Solutia site. The Dupo Anticline strikes north-northwest and has a gentle slope on the east side and a steeper slope on the west side. This anticline has a history of natural gas production as well as small amounts of oil.

The nearest notable karst feature to the Solutia site is a sinkhole in Lafayette Park located approximately 1.25 miles west-northwest of the site. Other sinkholes may be closer to the site, but their presence has been obscured by development.

Table 1

Stratigraphic Unit	Thickness (Feet)	Approximate Depth at Site (Feet)	Elevation (Feet MSL)
Alluvium	60	0 – 60	420 – 360
St. Louis Limestone	90	60 – 150	360 - 270
Salem Formation	140	150 – 290	270 - 130
Warsaw Formation	110	290 – 400	130 - 20
Burlington-Keokuk Limestone undifferentiated	155	400 – 555	20 – (-135)
Fern Glen Formation	60	555 – 615	(-135) – (-290)
Chouteau Group	50	615 – 655	(-290) – (-340)
Grassy Creek Shale	20	655 – 675	(-340) – (-360)
Silurian limestones	120	675 – 795	(-360) – (-480)
Maquoketa Shale	140	795 – 935	(-480) – (-620)
Ordovician System Carbonates and Sandstone	1470	935 – 2405	(-620) – (-2090)
Cambrian System Carbonates and Sandstone	1390	2405 – 3795	(-2090) – (-3480)

Table 1. The stratigraphy from the surface to 795 feet below the surface was derived from the interpretation of data collected from a well located in NW ¼, NE ¼ Section. 26, Township 45 N. Range 7 E. (Mssouri well log 3089). The stratigraphy from 795 feet to 3795 feet below ground surface was interpreted from data collected from a well located in SW ¼, SE ¼, SW ¼, Section 30, Township 45 N. Range 7 E. (Missouri well log # 2460).

REFERENCES CITED

Burns & McDonnell, 1994,Clark Refining Site Characterization Report [unpublished].

Lutzen, J. and Rockaway, D., 1971, Engineering Geology of St. Louis County Missouri, Engineering Geology Series No. 4, Missouri Geological Survey and Water Resources.

Hebrank, A. W., 1997, Geologic Tour of the St.Louis Riverfront (A Walking Tour), Special Publication No. 6.

McCracken, M. H., 1971, Structural Features of Missouri, Report of Investigations No.49, Missouri Department of Natural Resources-Division of Geology and Land Survey.

Missouri Department of Natural Resources (Division of Geology and Land Survey), 1986, Missouri Water Atlas.

Thompson, T. L., 1986, Paleozoic Succession in Missouri, Part 4, Mississipian System, Report of Investigations No. 70, Missouri Department of Natural Resources -Division of Geology and Land Survey.

Thompson, T. L., 1991, Paleozoic Succession in Missouri, Part 2, Ordovician System, Report of Investigations No. 70, Missouri Department of Natural Resources-Division of Geology and Land Survey.

Thompson, T. L., 1993, "The Paleozoic Succession in Missouri, Part 3, Silurian and Devonian Systems, Report of Investigations No. 70, Missouri Department of Natural Resources – Division of Geology and Land Survey.

Thompson, T. L., 1995, "The Stratigraphic Succession in Missouri." [revised]: Missouri Department of Natural Resources-Division of Geology and Land Survey.

Robertson, C. E., Fuller, D. L., Knight, R.D., Howe, W.B., 1963, Groundwater Maps of Missouri, Division of Geological Survey and Water Resources.

Missouri Department of Natural Resources-Division of Geology and Land Survey, 1993, Stratigraphic Nomenclature, Information Circular No. 31.

Appendix J

Split-Sampling Results

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0001870
Lab Number: 00-D1866

Reported To:	LARRY LEHMAN	Report Date:	7/11/00
Affiliation:	ESP	Date Collected:	6/29/00
Project Code:	4908/3000	Date Received:	6/30/00

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: SOLUTIA QUEENY PLANT, ST. LOUIS, MO
Sample Description: WELL HW-1B

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	1,350	umhos/cm	6/29/00	120.1
Comment: Analyzed in field				
pH	7.31		6/29/00	150.1
Comment: Analyzed in field				
Temperature - C	22	Degrees C	6/29/00	
Comment: Analyzed in field				
VOA Results:				
Chloromethane	< 20.0	ug/L	6/30/00	8260
Vinyl Chloride	< 1.0	ug/L	6/30/00	8260
Bromomethane	< 5.0	ug/L	6/30/00	8260
Chloroethane	< 5.0	ug/L	6/30/00	8260
1,1-Dichloroethene	14.6	ug/L	6/30/00	8260
Acetone	< 20.0	ug/L	6/30/00	8260
Carbon Disulfide	< 1.0	ug/L	6/30/00	8260
Methylene Chloride	< 20.0	ug/L	6/30/00	8260
Methyl Tert-Butyl Ether	< 2.0	ug/L	6/30/00	8260
trans-1,2-Dichloroethene	2.8	ug/L	6/30/00	8260
1,1-Dichloroethane	17.1	ug/L	6/30/00	8260
2-Butanone	< 5.0	ug/L	6/30/00	8260
cis-1,2-Dichloroethene	1,420	ug/L	6/30/00	8260
Chloroform	< 1.0	ug/L	6/30/00	8260
1,1,1-Trichloroethane	1.3	ug/L	6/30/00	8260
Carbon Tetrachloride	< 1.0	ug/L	6/30/00	8260
Benzene	< 1.0	ug/L	6/30/00	8260
.,2-Dichloroethane	< 1.0	ug/L	6/30/00	8260

Recycled Paper

Lab Number: 00-D1866
Sample Number: 0001870
July 11, 2000

Analysis Performed	Results		Analyzed	Method
Trichloroethene	852	ug/L	6/30/00	8260
1,2-Dichloropropane	< 1.0	ug/L	6/30/00	8260
Bromodichloromethane	< 1.0	ug/L	6/30/00	8260
2-Hexanone	< 2.0	ug/L	6/30/00	8260
Trans-1,3-Dichloropropene	< 1.0	ug/L	6/30/00	8260
Toluene	1.8	ug/L	6/30/00	8260
CIS-1,3-Dichloropropene	< 1.0	ug/L	6/30/00	8260
1,1,2-Trichloroethane	< 1.0	ug/L	6/30/00	8260
4-Methyl-2-Pentanone	< 1.0	ug/L	6/30/00	8260
Tetrachloroethene	31.4	ug/L	6/30/00	8260
Dibromochloromethane	< 1.0	ug/L	6/30/00	8260
Chlorobenzene	< 1.0	ug/L	6/30/00	8260
Ethylbenzene	< 1.0	ug/L	6/30/00	8260
Total Xylenes	< 2.0	ug/L	6/30/00	8260
Styrene	< 1.0	ug/L	6/30/00	8260
Bromoform	< 1.0	ug/L	6/30/00	8260
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	6/30/00	8260
1,3-Dichlorobenzene	< 1.0	ug/L	6/30/00	8260
1,4-Dichlorobenzene	< 1.0	ug/L	6/30/00	8260
1,2-Dichlorobenzene	< 1.0	ug/L	6/30/00	8260
Diethyl Ether	< 20.0	ug/L	6/30/00	8260
Iodomethane	< 5.0	ug/L	6/30/00	8260
Acrylonitrile	< 2.0	ug/L	6/30/00	8260
Allyl Chloride	< 1.0	ug/L	6/30/00	8260
Propionitrile	< 20.0	ug/L	6/30/00	8260
Methacrylonitrile	< 1.0	ug/L	6/30/00	8260
Methyl Acrylate	< 10.0	ug/L	6/30/00	8260
Tetrahydrofuran	< 5.0	ug/L	6/30/00	8260
1-Chlorobutane	< 1.0	ug/L	6/30/00	8260
Chloroacetonitrile	< 2.0	ug/L	6/30/00	8260
2-Nitropropane	< 1.0	ug/L	6/30/00	8260
Methylmethacrylate	< 1.0	ug/L	6/30/00	8260
1,1-Dichloropropanone	< 2.0	ug/L	6/30/00	8260
Ethyl Methacrylate	< 1.0	ug/L	6/30/00	8260
t-1,4-Dichloro-2-butene	< 1.0	ug/L	6/30/00	8260
Pentachloroethane	< 1.0	ug/L	6/30/00	8260
Hexachloroethane	< 1.0	ug/L	6/30/00	8260
Nitrobenzene	< 10.0	ug/L	6/30/00	8260
Dichlorodifluoromethane	< 1.0	ug/L	6/30/00	8260
Trichlorofluoromethane	< 5.0	ug/L	6/30/00	8260
2,2-Dichloropropane	< 1.0	ug/L	6/30/00	8260
Bromochloromethane	< 1.0	ug/L	6/30/00	8260
1,1-Dichloropropene	< 1.0	ug/L	6/30/00	8260
Dibromomethane	< 1.0	ug/L	6/30/00	8260
1,3-Dichloropropane	< 1.0	ug/L	6/30/00	8260
1,2-Dibromoethane	< 1.0	ug/L	6/30/00	8260
,1,1,2-Tetrachloroethane	< 1.0	ug/L	6/30/00	8260

Lab Number: 00-D1866
Sample Number: 0001870
July 11, 2000

Analysis Performed	Results		Analyzed	Method
Isopropylbenzene	< 1.0	ug/L	6/30/00	8260
1,2,3-Trichloropropane	< 1.0	ug/L	6/30/00	8260
n-Propylbenzene	< 1.0	ug/L	6/30/00	8260
Bromobenzene	< 1.0	ug/L	6/30/00	8260
2-Chlorotoluene	< 1.0	ug/L	6/30/00	8260
4-Chlorotoluene	< 1.0	ug/L	6/30/00	8260
1,3,5-Trimethylbenzene	< 1.0	ug/L	6/30/00	8260
tert-Butylbenzene	< 2.0	ug/L	6/30/00	8260
1,2,4-Trimethylbenzene	< 1.0	ug/L	6/30/00	8260
sec-Butylbenzene	< 1.0	ug/L	6/30/00	8260
p-isopropyltoluene	< 1.0	ug/L	6/30/00	8260
n-Butylbenzene	< 1.0	ug/L	6/30/00	8260
1,2-Dibromo-3-Chloroprop	< 1.0	ug/L	6/30/00	8260
1,2,4-Trichlorobenzene	< 1.0	ug/L	6/30/00	8260
Hexachlorobutadiene	< 1.0	ug/L	6/30/00	8260
Naphthalene	< 2.0	ug/L	6/30/00	8260
1,2,3-Trichlorobenzene	< 1.0	ug/L	6/30/00	8260
	< 2.0	ug/L	6/30/00	8260

VOA Comments:
A 1:10 dilution was analyzed on 7/5/00 to quantitate TCE and cis-1,2-Dichloroethene.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Douglas N. Edwards for
James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0004550
Lab Number: 00-D1592

Reported To:	LARRY LEHMAN	Report Date:	6/29/00
Affiliation:	ESP	Date Collected:	6/14/00
Project Code:	4908/3000	Date Received:	6/15/00

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: SOLUTIA QUEENY PLANT, ST. LOUIS, MO
Sample Description: MW-3

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	7.29	umhos/cm	6/14/00	120.1
Comment: Analyzed in field				
pH	6.74		6/14/00	150.1
Comment: Analyzed in field				
Temperature - C	20	Degrees C	6/14/00	
Comment: Analyzed in field				
VOA Results:				
Chloromethane	< 400	ug/L	6/19/00	8260
Vinyl Chloride	21.3	ug/L	6/19/00	8260
Bromomethane	< 100	ug/L	6/19/00	8260
Chloroethane	< 100	ug/L	6/19/00	8260
1,1-Dichloroethene	< 20.0	ug/L	6/19/00	8260
Acetone	< 400	ug/L	6/19/00	8260
Carbon Disulfide	< 20.0	ug/L	6/19/00	8260
Methylene Chloride	< 400	ug/L	6/19/00	8260
Methyl Tert-Butyl Ether	< 40.0	ug/L	6/19/00	8260
trans-1,2-Dichloroethene	< 20.0	ug/L	6/19/00	8260
1,1-Dichloroethane	< 20.0	ug/L	6/19/00	8260
2-Butanone	< 100	ug/L	6/19/00	8260
cis-1,2-Dichloroethene	466	ug/L	6/19/00	8260
Chloroform	< 20.0	ug/L	6/19/00	8260
1,1,1-Trichloroethane	< 20.0	ug/L	6/19/00	8260
Carbon Tetrachloride	< 20.0	ug/L	6/19/00	8260
Benzene	< 20.0	ug/L	6/19/00	8260
1,2-Dichloroethane	< 20.0	ug/L	6/19/00	8260

Page 2
Lab Number: 00-D1592
Sample Number: 0004550
June 29, 2000

Analysis Performed	Results		Analyzed	Method
Trichloroethene	183	ug/L	6/19/00	8260
1,2-Dichloropropane	< 20.0	ug/L	6/19/00	8260
Bromodichloromethane	< 20.0	ug/L	6/19/00	8260
2-Hexanone	< 40.0	ug/L	6/19/00	8260
Trans-1,3-Dichloropropene	< 20.0	ug/L	6/19/00	8260
Toluene	< 20.0	ug/L	6/19/00	8260
CIS-1,3-Dichloropropene	< 20.0	ug/L	6/19/00	8260
1,1,2-Trichloroethane	< 20.0	ug/L	6/19/00	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	6/19/00	8260
Tetrachloroethene	392	ug/L	6/19/00	8260
Dibromochloromethane	< 20.0	ug/L	6/19/00	8260
Chlorobenzene	168	ug/L	6/19/00	8260
Ethylbenzene	< 20.0	ug/L	6/19/00	8260
Total Xylenes	< 40.0	ug/L	6/19/00	8260
Styrene	< 20.0	ug/L	6/19/00	8260
Bromoform	< 20.0	ug/L	6/19/00	8260
1,1,2,2-Tetrachloroethane	< 20.0	ug/L	6/19/00	8260
1,3-Dichlorobenzene	< 20.0	ug/L	6/19/00	8260
1,4-Dichlorobenzene	< 20.0	ug/L	6/19/00	8260
1,2-Dichlorobenzene	< 20.0	ug/L	6/19/00	8260
Diethyl Ether	< 400	ug/L	6/19/00	8260
Iodomethane	< 100	ug/L	6/19/00	8260
Acrylonitrile	< 40.0	ug/L	6/19/00	8260
Allyl Chloride	< 20.0	ug/L	6/19/00	8260
Propionitrile	< 400	ug/L	6/19/00	8260
Methacrylonitrile	< 20.0	ug/L	6/19/00	8260
Methyl Acrylate	< 200	ug/L	6/19/00	8260
Tetrahydrofuran	< 100	ug/L	6/19/00	8260
1-Chlorobutane	< 20.0	ug/L	6/19/00	8260
Chloroacetonitrile	< 40.0	ug/L	6/19/00	8260
2-Nitropropane	< 20.0	ug/L	6/19/00	8260
Methylmethacrylate	< 20.0	ug/L	6/19/00	8260
1,1-Dichloropropanone	< 40.0	ug/L	6/19/00	8260
Ethyl Methacrylate	< 20.0	ug/L	6/19/00	8260
t-1,4-Dichloro-2-butene	< 20.0	ug/L	6/19/00	8260
Pentachloroethane	< 20.0	ug/L	6/19/00	8260
Hexachloroethane	< 20.0	ug/L	6/19/00	8260
Nitrobenzene	< 200	ug/L	6/19/00	8260
Dichlorodifluoromethane	< 20.0	ug/L	6/19/00	8260
Trichlorofluoromethane	< 100	ug/L	6/19/00	8260
2,2-Dichloropropane	< 20.0	ug/L	6/19/00	8260
Bromochloromethane	< 20.0	ug/L	6/19/00	8260
1,1-Dichloropropene	< 20.0	ug/L	6/19/00	8260
Dibromomethane	< 20.0	ug/L	6/19/00	8260
1,3-Dichloropropane	< 20.0	ug/L	6/19/00	8260
1,2-Dibromoethane	< 20.0	ug/L	6/19/00	8260
1,1,1,2-Tetrachloroethane	< 20.0	ug/L	6/19/00	8260

Lab Number: 00-D1592
Sample Number: 0004550
June 29, 2000

Analysis Performed	Results		Analyzed	Method
Isopropylbenzene	< 20.0	ug/L	6/19/00	8260
1,2,3-Trichloropropane	< 20.0	ug/L	6/19/00	8260
n-Propylbenzene	< 20.0	ug/L	6/19/00	8260
Bromobenzene	< 20.0	ug/L	6/19/00	8260
2-Chlorotoluene	< 20.0	ug/L	6/19/00	8260
4-Chlorotoluene	< 20.0	ug/L	6/19/00	8260
1,3,5-Trimethylbenzene	< 20.0	ug/L	6/19/00	8260
tert-Butylbenzene	< 40.0	ug/L	6/19/00	8260
1,2,4-Trimethylbenzene	< 20.0	ug/L	6/19/00	8260
sec-Butylbenzene	< 20.0	ug/L	6/19/00	8260
p-isopropyltoluene	< 20.0	ug/L	6/19/00	8260
n-Butylbenzene	< 20.0	ug/L	6/19/00	8260
1,2-Dibromo-3-Chloroprop	< 20.0	ug/L	6/19/00	8260
1,2,4-Trichlorobenzene	< 20.0	ug/L	6/19/00	8260
Hexachlorobutadiene	< 40.0	ug/L	6/19/00	8260
Naphthalene	< 20.0	ug/L	6/19/00	8260
1,2,3-Trichlorobenzene	< 40.0	ug/L	6/19/00	8260
BNA Results:				
Phenol	< 5.0	ug/L	6/22/00	8270
bis(-2-Chloroethyl)Ether	< 5.0	ug/L	6/22/00	8270
-Chlorophenol	< 10.0	ug/L	6/22/00	8270
,3-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
1,4-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
N-nitrosodimethylamine	< 5.0	ug/L	6/22/00	8270
1,2-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
2-Methylphenol	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroisopropyl)Eth	< 5.0	ug/L	6/22/00	8270
4-Methylphenol	< 5.0	ug/L	6/22/00	8270
N-Nitro-Di-n-Propylamine	< 5.0	ug/L	6/22/00	8270
Hexachloroethane	< 5.0	ug/L	6/22/00	8270
Nitrobenzene	< 5.0	ug/L	6/22/00	8270
Isophorone	< 5.0	ug/L	6/22/00	8270
2-Nitrophenol	< 10.0	ug/L	6/22/00	8270
2,4-Dimethylphenol	< 5.0	ug/L	6/22/00	8270
Benzoic Acid	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroethoxy)Methan	< 5.0	ug/L	6/22/00	8270
2,4-Dichlorophenol	< 5.0	ug/L	6/22/00	8270
1,2,4-Trichlorobenzene	< 5.0	ug/L	6/22/00	8270
Naphthalene	< 5.0	ug/L	6/22/00	8270
4-Chloroaniline	< 10.0	ug/L	6/22/00	8270
Hexachlorobutadiene	< 5.0	ug/L	6/22/00	8270
4-Chloro-3-Methylphenol	< 10.0	ug/L	6/22/00	8270
2-Methylnaphthalene	< 5.0	ug/L	6/22/00	8270
Hexachlorocyclopentadiene	< 5.0	ug/L	6/22/00	8270
2,4,6-Trichlorophenol	< 10.0	ug/L	6/22/00	8270
,4,5-Trichlorophenol	< 5.0	ug/L	6/22/00	8270
-Chloronaphthalene	< 10.0	ug/L	6/22/00	8270

Lab Number: 00-D1592
Sample Number: 0004550
June 29, 2000

Analysis Performed	Results		Analyzed	Method
2-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Dimethylphthalate	< 5.0	ug/L	6/22/00	8270
Acenaphthylene	< 5.0	ug/L	6/22/00	8270
2,6-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
3-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Acenaphthene	< 5.0	ug/L	6/22/00	8270
2,4-Dinitrophenol	< 15.0	ug/L	6/22/00	8270
4-Nitrophenol	< 10.0	ug/L	6/22/00	8270
Dibenzofuran	< 5.0	ug/L	6/22/00	8270
2,4-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
Diethylphthalate	< 5.0	ug/L	6/22/00	8270
4-Chlorophenyl-phenylethe	< 5.0	ug/L	6/22/00	8270
Fluorene	< 5.0	ug/L	6/22/00	8270
4-Nitroaniline	< 10.0	ug/L	6/22/00	8270
4,6-Dinitro-2-Methylpheno	< 10.0	ug/L	6/22/00	8270
N-Nitrosodiphenylamine	< 5.0	ug/L	6/22/00	8270
4-Bromophenyl-phenylether	< 5.0	ug/L	6/22/00	8270
Hexachlorobenzene	< 5.0	ug/L	6/22/00	8270
Pentachlorophenol	< 10.0	ug/L	6/22/00	8270
Phenanthrene	< 5.0	ug/L	6/22/00	8270
Anthracene	< 5.0	ug/L	6/22/00	8270
Di-n-Butylphthalate	< 5.0	ug/L	6/22/00	8270
Fluoranthene	< 5.0	ug/L	6/22/00	8270
Pyrene	< 10.0	ug/L	6/22/00	8270
Butylbenzylphthalate	< 5.0	ug/L	6/22/00	8270
3-3'-Dichlorobenzidine	< 10.0	ug/L	6/22/00	8270
Benzo(a)anthracene	< 5.0	ug/L	6/22/00	8270
Chrysene	< 5.0	ug/L	6/22/00	8270
bis(2-ethylhexyl)phthalat	< 5.0	ug/L	6/22/00	8270
Di-n-Octylphthalate	< 20.0	ug/L	6/22/00	8270
Benzo(b)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(k)fluoranthene	< 5.0	ug/L.	6/22/00	8270
Benzo(a)pyrene	< 5.0	ug/L	6/22/00	8270
Indeno(1,2,3-cd)pyrene	10.0	ug/L	6/22/00	8270
Dibenz(a,h)anthracene	< 5.0	ug/L	6/22/00	8270
Benzo(g,h,i)perylene	8.5	ug/L	6/22/00	8270

VOA Comments:
A 1:20 dilution was analyzed to quantitate the target compounds due to matrix interference.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. L

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0004552
Lab Number: 00-D1594

Reported To: LARRY LEHMAN
Affiliation: ESP
Project Code: 4908/3000

Report Date: 7/ 5/00
Date Collected: 6/15/00
Date Received: 6/15/00

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: SOLUTIA QUEENY PLANT, ST. LOUIS, MO
Sample Description: MW-13

Analysis Performed	Results		Analyzed	Method
pH	7.57		6/15/00	150.1
Comment: Analyzed in field				
Temperature - C	19	Degrees C	6/15/00	
Comment: Analyzed in field				
VOA Results:				
Chloromethane	< 400	ug/L	6/16/00	8260
Vinyl Chloride	< 20.0	ug/L	6/16/00	8260
Bromomethane	< 100	ug/L	6/16/00	8260
Chloroethane	< 100	ug/L	6/16/00	8260
1,1-Dichloroethene	< 20.0	ug/L	6/16/00	8260
Acetone	< 400	ug/L	6/16/00	8260
Carbon Disulfide	< 20.0	ug/L	6/16/00	8260
Methylene Chloride	< 400	ug/L	6/16/00	8260
Methyl Tert-Butyl Ether	< 40.0	ug/L	6/16/00	8260
trans-1,2-Dichloroethene	< 20.0	ug/L	6/16/00	8260
1,1-Dichloroethane	< 20.0	ug/L	6/16/00	8260
2-Butanone	< 100	ug/L	6/16/00	8260
cis-1,2-Dichloroethene	< 20.0	ug/L	6/16/00	8260
Chloroform	< 20.0	ug/L	6/16/00	8260
1,1,1-Trichloroethane	< 20.0	ug/L	6/16/00	8260
Carbon Tetrachloride	< 20.0	ug/L	6/16/00	8260
Benzene	1,110	ug/L	6/16/00	8260
1,2-Dichloroethane	< 20.0	ug/L	6/16/00	8260
Trichloroethene	< 20.0	ug/L	6/16/00	8260
1,2-Dichloropropane	< 20.0	ug/L	6/16/00	8260

Analysis Performed	Results		Analyzed	Method
Bromodichloromethane	< 20.0	ug/L	6/16/00	8260
2-Hexanone	< 40.0	ug/L	6/16/00	8260
Trans-1,3-Dichloropropene	< 20.0	ug/L	6/16/00	8260
Toluene	< 20.0	ug/L	6/16/00	8260
CIS-1,3-Dichloropropene	< 20.0	ug/L	6/16/00	8260
1,1,2-Trichloroethane	< 20.0	ug/L	6/16/00	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	6/16/00	8260
Tetrachloroethene	< 20.0	ug/L	6/16/00	8260
Dibromochloromethane	< 20.0	ug/L	6/16/00	8260
Chlorobenzene	2,460	ug/L	6/16/00	8260
Ethylbenzene	< 20.0	ug/L	6/16/00	8260
Total Xylenes	< 40.0	ug/L	6/16/00	8260
Styrene	< 20.0	ug/L	6/16/00	8260
Bromoform	< 20.0	ug/L	6/16/00	8260
1,1,2,2-Tetrachloroethane	< 20.0	ug/L	6/16/00	8260
1,3-Dichlorobenzene	< 20.0	ug/L	6/16/00	8260
1,4-Dichlorobenzene	< 20.0	ug/L	6/16/00	8260
1,2-Dichlorobenzene	< 20.0	ug/L	6/16/00	8260
Diethyl Ether	< 400	ug/L	6/16/00	8260
Iodomethane	< 100	ug/L	6/16/00	8260
Acrylonitrile	< 40.0	ug/L	6/16/00	8260
Allyl Chloride	< 20.0	ug/L	6/16/00	8260
Propionitrile	< 400	ug/L	6/16/00	8260
Methacrylonitrile	< 20.0	ug/L	6/16/00	8260
Methyl Acrylate	< 200	ug/L	6/16/00	8260
Tetrahydrofuran	< 100	ug/L	6/16/00	8260
1-Chlorobutane	< 20.0	ug/L	6/16/00	8260
Chloroacetonitrile	< 40.0	ug/L	6/16/00	8260
2-Nitropropane	< 20.0	ug/L	6/16/00	8260
Methylmethacrylate	< 20.0	ug/L	6/16/00	8260
1,1-Dichloropropanone	< 40.0	ug/L	6/16/00	8260
Ethyl Methacrylate	< 20.0	ug/L	6/16/00	8260
t-1,4-Dichloro-2-butene	< 20.0	ug/L	6/16/00	8260
Pentachloroethane	< 20.0	ug/L	6/16/00	8260
Hexachloroethane	< 20.0	ug/L	6/16/00	8260
Nitrobenzene	< 200	ug/L	6/16/00	8260
Dichlorodifluoromethane	< 20.0	ug/L	6/16/00	8260
Trichlorofluoromethane	< 100	ug/L	6/16/00	8260
2,2-Dichloropropane	< 20.0	ug/L	6/16/00	8260
Bromochloromethane	< 20.0	ug/L	6/16/00	8260
1,1-Dichloropropene	< 20.0	ug/L	6/16/00	8260
Dibromomethane	< 20.0	ug/L	6/16/00	8260
1,3-Dichloropropane	< 20.0	ug/L	6/16/00	8260
1,2-Dibromoethane	< 20.0	ug/L	6/16/00	8260
1,1,1,2-Tetrachloroethane	< 20.0	ug/L	6/16/00	8260
Isopropylbenzene	< 20.0	ug/L	6/16/00	8260
1,2,3-Trichloropropane	< 20.0	ug/L	6/16/00	8260

Analysis Performed	Results		Analyzed	Method
n-Propylbenzene	< 20.0	ug/L	6/16/00	8260
Bromobenzene	< 20.0	ug/L	6/16/00	8260
2-Chlorotoluene	< 20.0	ug/L	6/16/00	8260
4-Chlorotoluene	< 20.0	ug/L	6/16/00	8260
1,3,5-Trimethylbenzene	< 20.0	ug/L	6/16/00	8260
tert-Butylbenzene	< 40.0	ug/L	6/16/00	8260
1,2,4-Trimethylbenzene	< 20.0	ug/L	6/16/00	8260
sec-Butylbenzene	< 20.0	ug/L	6/16/00	8260
p-isopropyltoluene	< 20.0	ug/L	6/16/00	8260
n-Butylbenzene	< 20.0	ug/L	6/16/00	8260
1,2-Dibromo-3-Chloroprop	< 20.0	ug/L	6/16/00	8260
1,2,4-Trichlorobenzene	< 20.0	ug/L	6/16/00	8260
Hexachlorobutadiene	< 40.0	ug/L	6/16/00	8260
Naphthalene	< 20.0	ug/L	6/16/00	8260
1,2,3-Trichlorobenzene	< 40.0	ug/L	6/16/00	8260
BNA Results:				
Phenol	< 5.0	ug/L	6/22/00	8270
bis(-2-Chloroethyl)Ether	< 5.0	ug/L	6/22/00	8270
2-Chlorophenol	< 10.0	ug/L	6/22/00	8270
1,3-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
,4-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
-nitrosodimethylamine	< 5.0	ug/L	6/22/00	8270
1,2-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
2-Methylphenol	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroisopropyl)Eth	< 5.0	ug/L	6/22/00	8270
4-Methylphenol	< 5.0	ug/L	6/22/00	8270
N-Nitro-Di-n-Propylamine	< 5.0	ug/L	6/22/00	8270
Hexachloroethane	< 5.0	ug/L	6/22/00	8270
Nitrobenzene	< 5.0	ug/L	6/22/00	8270
Isophorone	< 5.0	ug/L	6/22/00	8270
2-Nitrophenol	< 10.0	ug/L	6/22/00	8270
2,4-Dimethylphenol	< 5.0	ug/L	6/22/00	8270
Benzoic Acid	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroethoxy)Methan	< 5.0	ug/L	6/22/00	8270
2,4-Dichlorophenol	< 5.0	ug/L	6/22/00	8270
1,2,4-Trichlorobenzene	< 5.0	ug/L	6/22/00	8270
Naphthalene	< 5.0	ug/L	6/22/00	8270
4-Chloroaniline	560	ug/L	6/22/00	8270
Comment: 1/10 dilution on 6/28/00				
Hexachlorobutadiene	< 5.0	ug/L	6/22/00	8270
4-Chloro-3-Methylphenol	< 10.0	ug/L	6/22/00	8270
2-Methylnaphthalene	< 5.0	ug/L	6/22/00	8270
Hexachlorocyclopentadiene	< 5.0	ug/L	6/22/00	8270
2,4,6-Trichlorophenol	< 10.0	ug/L	6/22/00	8270
2,4,5-Trichlorophenol	< 5.0	ug/L	6/22/00	8270
-Chloronaphthalene	< 10.0	ug/L	6/22/00	8270
-Nitroaniline	< 10.0	ug/L	6/22/00	8270

Lab Number: 00-D1594
Sample Number: 0004552
~uly 5, 2000

Analysis Performed	Results		Analyzed	Method
Dimethylphthalate	< 5.0	ug/L	6/22/00	8270
Acenaphthylene	< 5.0	ug/L	6/22/00	8270
2,6-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
3-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Acenaphthene	6.3	ug/L	6/22/00	8270
2,4-Dinitrophenol	< 15.0	ug/L	6/22/00	8270
4-Nitrophenol	< 10.0	ug/L	6/22/00	8270
Dibenzofuran	< 5.0	ug/L	6/22/00	8270
2,4-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
Diethylphthalate	< 5.0	ug/L	6/22/00	8270
4-Chlorophenyl-phenylethe	< 5.0	ug/L	6/22/00	8270
Fluorene	< 5.0	ug/L	6/22/00	8270
4-Nitroaniline	< 10.0	ug/L	6/22/00	8270
4,6-Dinitro-2-Methylpheno	< 10.0	ug/L	6/22/00	8270
N-Nitrosodiphenylamine	< 5.0	ug/L	6/22/00	8270
4-Bromophenyl-phenylether	< 5.0	ug/L	6/22/00	8270
Hexachlorobenzene	< 5.0	ug/L	6/22/00	8270
Pentachlorophenol	< 10.0	ug/L	6/22/00	8270
Phenanthrene	< 5.0	ug/L	6/22/00	8270
Anthracene	< 5.0	ug/L	6/22/00	8270
Di-n-Butylphthalate	< 5.0	ug/L	6/22/00	8270
Fluoranthene	< 5.0	ug/L	6/22/00	8270
Pyrene	< 10.0	ug/L	6/22/00	8270
Butylbenzylphthalate	< 5.0	ug/L	6/22/00	8270
3-3'-Dichlorobenzidine	< 10.0	ug/L	6/22/00	8270
Benzo(a)anthracene	< 5.0	ug/L	6/22/00	8270
Chrysene	< 5.0	ug/L	6/22/00	8270
bis(2-ethylhexyl)phthalat	8.7	ug/L	6/22/00	8270
Di-n-Octylphthalate	< 20.0	ug/L	6/22/00	8270
Benzo(b)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(k)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(a)pyrene	< 5.0	ug/L	6/22/00	8270
Indeno(1,2,3-cd)pyrene	< 5.0	ug/L	6/22/00	8270
Dibenz(a,h)anthracene	< 5.0	ug/L	6/22/00	8270
Benzo(g,h,i)perylene	< 5.0	ug/L	6/22/00	8270

VOA Comments:
A 1:20 dilution was analyzed to quantitate the target compounds due to matrix interference.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0001871
Lab Number: 00-D1867

Reported To: LARRY LEHMAN
Affiliation: ESP
Project Code: 4908/3000

Report Date: 7/18/00
Date Collected: 6/29/00
Date Received: 6/30/00

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: SOLUTIA QUEENY PLANT, ST. LOUIS, MO
Sample Description: WELL MW-8A

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	1,790	umhos/cm	6/29/00	120.1
Comment: Analyzed in field				
pH	7.00		6/29/00	150.1
Comment: Analyzed in field				
Temperature - C	22	Degrees C	6/29/00	
Comment: Analyzed in field				
VOA Results:				
Chloromethane	< 20.0	ug/L	7/ 5/00	8260
Vinyl Chloride	1.7	ug/L	7/ 5/00	8260
Bromomethane	< 5.0	ug/L	7/ 5/00	8260
Chloroethane	< 5.0	ug/L	7/ 5/00	8260
1,1-Dichloroethene	< 1.0	ug/L	7/ 5/00	8260
Acetone	< 20.0	ug/L	7/ 5/00	8260
Carbon Disulfide	< 1.0	ug/L	7/ 5/00	8260
Methylene Chloride	< 20.0	ug/L	7/ 5/00	8260
Methyl Tert-Butyl Ether	< 2.0	ug/L	7/ 5/00	8260
trans-1,2-Dichloroethene	< 1.0	ug/L	7/ 5/00	8260
1,1-Dichloroethane	2.3	ug/L	7/ 5/00	8260
2-Butanone	< 5.0	ug/L	7/ 5/00	8260
cis-1,2-Dichloroethene	1.7	ug/L	7/ 5/00	8260
Chloroform	< 1.0	ug/L	7/ 5/00	8260
1,1,1-Trichloroethane	< 1.0	ug/L	7/ 5/00	8260
Carbon Tetrachloride	< 1.0	ug/L	7/ 5/00	8260
Benzene	19.6	ug/L	7/ 5/00	8260
,2-Dichloroethane	< 1.0	ug/L	7/ 5/00	8260

Lab Number: 00-D1867
Sample Number: 0001871
July 18, 2000

Analysis Performed	Results		Analyzed	Method
Trichloroethene	3.3	ug/L	7/ 5/00	8260
1,2-Dichloropropane	< 1.0	ug/L	7/ 5/00	8260
Bromodichloromethane	< 1.0	ug/L	7/ 5/00	8260
2-Hexanone	< 2.0	ug/L	7/ 5/00	8260
Trans-1,3-Dichloropropene	< 1.0	ug/L	7/ 5/00	8260
Toluene	2.7	ug/L	7/ 5/00	8260
CIS-1,3-Dichloropropene	< 1.0	ug/L	7/ 5/00	8260
1,1,2-Trichloroethane	< 1.0	ug/L	7/ 5/00	8260
4-Methyl-2-Pentanone	< 1.0	ug/L	7/ 5/00	8260
Tetrachloroethene	82.0	ug/L	7/ 5/00	8260
Dibromochloromethane	< 1.0	ug/L	7/ 5/00	8260
Chlorobenzene	4,550	ug/L	7/ 5/00	8260
Ethylbenzene	< 1.0	ug/L	7/ 5/00	8260
Total Xylenes	< 2.0	ug/L	7/ 5/00	8260
Styrene	< 1.0	ug/L	7/ 5/00	8260
Bromoform	< 1.0	ug/L	7/ 5/00	8260
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	7/ 5/00	8260
1,3-Dichlorobenzene	< 1.0	ug/L	7/ 5/00	8260
1,4-Dichlorobenzene	6.0	ug/L	7/ 5/00	8260
1,2-Dichlorobenzene	4.0	ug/L	7/ 5/00	8260
Diethyl Ether	< 20.0	ug/L	7/ 5/00	8260
Iodomethane	< 5.0	ug/L	7/ 5/00	8260
Acrylonitrile	< 2.0	ug/L	7/ 5/00	8260
Allyl Chloride	< 1.0	ug/L	7/ 5/00	8260
Propionitrile	< 20.0	ug/L	7/ 5/00	8260
Methacrylonitrile	< 1.0	ug/L	7/ 5/00	8260
Methyl Acrylate	< 10.0	ug/L	7/ 5/00	8260
Tetrahydrofuran	< 5.0	ug/L	7/ 5/00	8260
1-Chlorobutane	< 1.0	ug/L	7/ 5/00	8260
Chloroacetonitrile	< 2.0	ug/L	7/ 5/00	8260
2-Nitropropane	< 1.0	ug/L	7/ 5/00	8260
Methylmethacrylate	< 1.0	ug/L	7/ 5/00	8260
1,1-Dichloropropanone	< 2.0	ug/L	7/ 5/00	8260
Ethyl Methacrylate	< 1.0	ug/L	7/ 5/00	8260
t-1,4-Dichloro-2-butene	< 1.0	ug/L	7/ 5/00	8260
Pentachloroethane	< 1.0	ug/L	7/ 5/00	8260
Hexachloroethane	< 1.0	ug/L	7/ 5/00	8260
Nitrobenzene	< 10.0	ug/L	7/ 5/00	8260
Dichlorodifluoromethane	< 1.0	ug/L	7/ 5/00	8260
Trichlorofluoromethane	< 5.0	ug/L	7/ 5/00	8260
2,2-Dichloropropane	< 1.0	ug/L	7/ 5/00	8260
Bromochloromethane	< 1.0	ug/L	7/ 5/00	8260
1,1-Dichloropropene	< 1.0	ug/L	7/ 5/00	8260
Dibromomethane	< 1.0	ug/L	7/ 5/00	8260
1,3-Dichloropropane	< 1.0	ug/L	7/ 5/00	8260
1,2-Dibromoethane	< 1.0	ug/L	7/ 5/00	8260
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	7/ 5/00	8260

Lab Number: 00-D1867
Sample Number: 0001871
July 18, 2000

Analysis Performed	Results		Analyzed	Method
Isopropylbenzene	< 1.0	ug/L	7/ 5/00	8260
1,2,3-Trichloropropane	< 1.0	ug/L	7/ 5/00	8260
n-Propylbenzene	< 1.0	ug/L	7/ 5/00	8260
Bromobenzene	< 1.0	ug/L	7/ 5/00	8260
2-Chlorotoluene	38.2	ug/L	7/ 5/00	8260
4-Chlorotoluene	< 1.0	ug/L	7/ 5/00	8260
1,3,5-Trimethylbenzene	< 1.0	ug/L	7/ 5/00	8260
tert-Butylbenzene	< 2.0	ug/L	7/ 5/00	8260
1,2,4-Trimethylbenzene	< 1.0	ug/L	7/ 5/00	8260
sec-Butylbenzene	< 1.0	ug/L	7/ 5/00	8260
p-isopropyltoluene	< 1.0	ug/L	7/ 5/00	8260
n-Butylbenzene	< 1.0	ug/L	7/ 5/00	8260
1,2-Dibromo-3-Chloroprop	< 1.0	ug/L	7/ 5/00	8260
1,2,4-Trichlorobenzene	< 1.0	ug/L	7/ 5/00	8260
Hexachlorobutadiene	< 2.0	ug/L	7/ 5/00	8260
Naphthalene	< 1.0	ug/L	7/ 5/00	8260
1,2,3-Trichlorobenzene	< 2.0	ug/L	7/ 5/00	8260
BNA Results:				
Phenol	6.4	ug/L	7/11/00	8270
bis(-2-Chloroethyl)Ether	< 5.0	ug/L	7/11/00	8270
-Chlorophenol	< 10.0	ug/L	7/11/00	8270
,3-Dichlorobenzene	< 5.0	ug/L	7/11/00	8270
,4-Dichlorobenzene	< 5.0	ug/L	7/11/00	8270
N-nitrosodimethylamine	< 5.0	ug/L	7/11/00	8270
1,2-Dichlorobenzene	< 5.0	ug/L	7/11/00	8270
2-Methylphenol	< 5.0	ug/L	7/11/00	8270
bis(2-Chloroisopropyl)Eth	< 5.0	ug/L	7/11/00	8270
4-Methylphenol	< 5.0	ug/L	7/11/00	8270
N-Nitro-Di-n-Propylamine	< 5.0	ug/L	7/11/00	8270
Hexachloroethane	< 5.0	ug/L	7/11/00	8270
Nitrobenzene	< 5.0	ug/L	7/11/00	8270
Isophorone	< 5.0	ug/L	7/11/00	8270
2-Nitrophenol	< 10.0	ug/L	7/11/00	8270
2,4-Dimethylphenol	< 5.0	ug/L	7/11/00	8270
Benzoic Acid	< 5.0	ug/L	7/11/00	8270
bis(2-Chloroethoxy)Methan	< 5.0	ug/L	7/11/00	8270
2,4-Dichlorophenol	< 5.0	ug/L	7/11/00	8270
1,2,4-Trichlorobenzene	< 5.0	ug/L	7/11/00	8270
Naphthalene	< 5.0	ug/L	7/11/00	8270
4-Chloroaniline	< 10.0	ug/L	7/11/00	8270
Hexachlorobutadiene	< 5.0	ug/L	7/11/00	8270
4-Chloro-3-Methylphenol	< 10.0	ug/L	7/11/00	8270
2-Methylnaphthalene	< 5.0	ug/L	7/11/00	8270
Hexachlorocyclopentadiene	< 5.0	ug/L	7/11/00	8270
2,4,6-Trichlorophenol	< 10.0	ug/L	7/11/00	8270
,4,5-Trichlorophenol	< 5.0	ug/L	7/11/00	8270
-Chloronaphthalene	< 10.0	ug/L	7/11/00	8270

Page 4
Lab Number: 00-D1867
Sample Number: 0001871
July 18, 2000

Analysis Performed	Results		Analyzed	Method
2-Nitroaniline	< 10.0	ug/L	7/11/00	8270
Dimethylphthalate	< 5.0	ug/L	7/11/00	8270
Acenaphthylene	< 5.0	ug/L	7/11/00	8270
2,6-Dinitrotoluene	< 5.0	ug/L	7/11/00	8270
3-Nitroaniline	< 10.0	ug/L	7/11/00	8270
Acenaphthene	< 5.0	ug/L	7/11/00	8270
2,4-Dinitrophenol	< 15.0	ug/L	7/11/00	8270
4-Nitrophenol	< 10.0	ug/L	7/11/00	8270
Dibenzofuran	< 5.0	ug/L	7/11/00	8270
2,4-Dinitrotoluene	< 5.0	ug/L	7/11/00	8270
Diethylphthalate	< 5.0	ug/L	7/11/00	8270
4-Chlorophenyl-phenylethe	< 5.0	ug/L	7/11/00	8270
Fluorene	< 5.0	ug/L	7/11/00	8270
4-Nitroaniline	< 10.0	ug/L	7/11/00	8270
4,6-Dinitro-2-Methylpheno	< 10.0	ug/L	7/11/00	8270
N-Nitrosodiphenylamine	< 5.0	ug/L	7/11/00	8270
4-Bromophenyl-phenylether	< 5.0	ug/L	7/11/00	8270
Hexachlorobenzene	< 5.0	ug/L	7/11/00	8270
Pentachlorophenol	< 10.0	ug/L	7/11/00	8270
Phenanthrene	< 5.0	ug/L	7/11/00	8270
Anthracene	< 5.0	ug/L	7/11/00	8270
i-n-Butylphthalate	< 5.0	ug/L	7/11/00	8270
.luoranthene	< 5.0	ug/L	7/11/00	8270
Pyrene	< 10.0	ug/L	7/11/00	8270
Butylbenzylphthalate	< 5.0	ug/L	7/11/00	8270
3-3'-Dichlorobenzidine	< 10.0	ug/L	7/11/00	8270
Benzo(a)anthracene	< 5.0	ug/L	7/11/00	8270
Chrysene	< 5.0	ug/L	7/11/00	8270
bis(2-ethylhexyl)phthalat	140	ug/L	7/11/00	8270
Comment: 1/10 dilution on 7/13/00				
Di-n-Octylphthalate	< 20.0	ug/L	7/11/00	8270
Benzo(b)fluoranthene	< 5.0	ug/L	7/11/00	8270
Benzo(k)fluoranthene	< 5.0	ug/L	7/11/00	8270
Benzo(a)pyrene	< 5.0	ug/L	7/11/00	8270
Indeno(1,2,3-cd)pyrene	< 5.0	ug/L	7/11/00	8270
Dibenz(a,h)anthracene	< 5.0	ug/L	7/11/00	8270
Benzo(g,h,i)perylene	< 5.0	ug/L	7/11/00	8270

VOA Comments:
A 1:50 dilution was analyzed on 7/6/00 to quantitate Chlorobenzene.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0004549
Lab Number: 00-D1591

Reported To: LARRY LEHMAN
Affiliation: ESP
Project Code: 4908/3000

Report Date: 7/26/00
Date Collected: 6/14/00
Date Received: 6/15/00

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: SOLUTIA QUEENY PLANT, ST. LOUIS, MO
Sample Description: GM-1

nalysis Performed	Results		Analyzed	Method
Specific Conductivity	1,870	umhos/cm	6/14/00	120.1
Comment: Analyzed in field				
pH	6.32		6/14/00	150.1
Comment: Analyzed in field				
Temperature - C	21	Degrees C	6/14/00	
Comment: Analyzed in field				
VOA Results:				
Chloromethane	< 400	ug/L	6/16/00	8260
Vinyl Chloride	< 20.0	ug/L	6/16/00	8260
Bromomethane	< 100	ug/L	6/16/00	8260
Chloroethane	< 100	ug/L	6/16/00	8260
1,1-Dichloroethene	< 20.0	ug/L	6/16/00	8260
Acetone	< 400	ug/L	6/16/00	8260
Carbon Disulfide	< 20.0	ug/L	6/16/00	8260
Methylene Chloride	< 400	ug/L	6/16/00	8260
Methyl Tert-Butyl Ether	< 40.0	ug/L	6/16/00	8260
trans-1,2-Dichloroethene	< 20.0	ug/L	6/16/00	8260
1,1-Dichloroethane	< 20.0	ug/L	6/16/00	8260
2-Butanone	< 100	ug/L	6/16/00	8260
cis-1,2-Dichloroethene	< 20.0	ug/L	6/16/00	8260
Chloroform	< 20.0	ug/L	6/16/00	8260
1,1,1-Trichloroethane	< 20.0	ug/L	6/16/00	8260
Carbon Tetrachloride	< 20.0	ug/L	6/16/00	8260
Benzene	47.2	ug/L	6/16/00	8260
,2-Dichloroethane	145	ug/L	6/16/00	8260

Recycled Paper

Page 2
Lab Number: 00-D1591
Sample Number: 0004549
uly 26, 2000

Analysis Performed	Results		Analyzed	Method
Trichloroethene	< 20.0	ug/L	6/16/00	8260
1,2-Dichloropropane	< 20.0	ug/L	6/16/00	8260
Bromodichloromethane	< 20.0	ug/L	6/16/00	8260
2-Hexanone	< 40.0	ug/L	6/16/00	8260
Trans-1,3-Dichloropropene	< 20.0	ug/L	6/16/00	8260
Toluene	< 20.0	ug/L	6/16/00	8260
CIS-1,3-Dichloropropene	< 20.0	ug/L	6/16/00	8260
1,1,2-Trichloroethane	< 20.0	ug/L	6/16/00	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	6/16/00	8260
Tetrachloroethene	< 20.0	ug/L	6/16/00	8260
Dibromochloromethane	< 20.0	ug/L	6/16/00	8260
Chlorobenzene	209,000	ug/L	6/16/00	8260
Ethylbenzene	< 20.0	ug/L	6/16/00	8260
Total Xylenes	< 40.0	ug/L	6/16/00	8260
Styrene	< 20.0	ug/L	6/16/00	8260
Bromoform	< 20.0	ug/L	6/16/00	8260
1,1,2,2-Tetrachloroethane	< 20.0	ug/L	6/16/00	8260
1,3-Dichlorobenzene	< 20.0	ug/L	6/16/00	8260
1,4-Dichlorobenzene	< 20.0	ug/L	6/16/00	8260
1,2-Dichlorobenzene	< 20.0	ug/L	6/16/00	8260
iethyl Ether	< 400	ug/L	6/16/00	8260
odomethane	< 100	ug/L	6/16/00	8260
Acrylonitrile	< 40.0	ug/L	6/16/00	8260
Allyl Chloride	< 20.0	ug/L	6/16/00	8260
Propionitrile	< 400	ug/L	6/16/00	8260
Methacrylonitrile	< 20.0	ug/L	6/16/00	8260
Methyl Acrylate	< 200	ug/L	6/16/00	8260
Tetrahydrofuran	< 100	ug/L	6/16/00	8260
1-Chlorobutane	< 20.0	ug/L	6/16/00	8260
Chloroacetonitrile	< 40.0	ug/L	6/16/00	8260
2-Nitropropane	< 20.0	ug/L	6/16/00	8260
Methylmethacrylate	< 20.0	ug/L	6/16/00	8260
1,1-Dichloropropanone	< 40.0	ug/L	6/16/00	8260
Ethyl Methacrylate	< 20.0	ug/L	6/16/00	8260
t-1,4-Dichloro-2-butene	< 20.0	ug/L	6/16/00	8260
Pentachloroethane	< 20.0	ug/L	6/16/00	8260
Hexachloroethane	< 20.0	ug/L	6/16/00	8260
Nitrobenzene	< 200	ug/L	6/16/00	8260
Dichlorodifluoromethane	< 20.0	ug/L	6/16/00	8260
Trichlorofluoromethane	< 100	ug/L	6/16/00	8260
2,2-Dichloropropane	< 20.0	ug/L	6/16/00	8260
Bromochloromethane	< 20.0	ug/L	6/16/00	8260
1,1-Dichloropropene	< 20.0	ug/L	6/16/00	8260
Dibromomethane	< 20.0	ug/L	6/16/00	8260
1,3-Dichloropropane	< 20.0	ug/L	6/16/00	8260
2-Dibromoethane	< 20.0	ug/L	6/16/00	8260
1,1,2-Tetrachloroethane	< 20.0	ug/L	6/16/00	8260

Page 3
Lab Number: 00-D1591
Sample Number: 0004549
July 26, 2000

Analysis Performed	Results		Analyzed	Method
Isopropylbenzene	< 20.0	ug/L	6/16/00	8260
1,2,3-Trichloropropane	< 20.0	ug/L	6/16/00	8260
n-Propylbenzene	< 20.0	ug/L	6/16/00	8260
Bromobenzene	37.7	ug/L	6/16/00	8260
2-Chlorotoluene	< 20.0	ug/L	6/16/00	8260
4-Chlorotoluene	< 20.0	ug/L	6/16/00	8260
1,3,5-Trimethylbenzene	< 20.0	ug/L	6/16/00	8260
tert-Butylbenzene	< 40.0	ug/L	6/16/00	8260
1,2,4-Trimethylbenzene	< 20.0	ug/L	6/16/00	8260
sec-Butylbenzene	< 20.0	ug/L	6/16/00	8260
p-isopropyltoluene	< 20.0	ug/L	6/16/00	8260
n-Butylbenzene	< 20.0	ug/L	6/16/00	8260
1,2-Dibromo-3-Chloroprop	< 20.0	ug/L	6/16/00	8260
1,2,4-Trichlorobenzene	< 20.0	ug/L	6/16/00	8260
Hexachlorobutadiene	< 40.0	ug/L	6/16/00	8260
Naphthalene	< 20.0	ug/L	6/16/00	8260
1,2,3-Trichlorobenzene	< 40.0	ug/L	6/16/00	8260
BNA Results:				
Phenol	8.7	ug/L	6/22/00	8270
bis(-2-Chloroethyl)Ether	< 5.0	ug/L	6/22/00	8270
2-Chlorophenol	48.0	ug/L	6/22/00	8270
1,3-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
1,4-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
N-nitrosodimethylamine	< 5.0	ug/L	6/22/00	8270
1,2-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
2-Methylphenol	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroisopropyl)Eth	< 5.0	ug/L	6/22/00	8270
4-Methylphenol	110	ug/L	6/22/00	8270
N-Nitro-Di-n-Propylamine	< 5.0	ug/L	6/22/00	8270
Hexachloroethane	< 5.0	ug/L	6/22/00	8270
Nitrobenzene	< 5.0	ug/L	6/22/00	8270
Isophorone	< 5.0	ug/L	6/22/00	8270
2-Nitrophenol	< 10.0	ug/L	6/22/00	8270
2,4-Dimethylphenol	< 5.0	ug/L	6/22/00	8270
Benzoic Acid	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroethoxy)Methan	< 5.0	ug/L	6/22/00	8270
2,4-Dichlorophenol	< 5.0	ug/L	6/22/00	8270
1,2,4-Trichlorobenzene	< 5.0	ug/L	6/22/00	8270
Naphthalene	< 5.0	ug/L	6/22/00	8270
4-Chloroaniline	< 10.0	ug/L	6/22/00	8270
Hexachlorobutadiene	< 5.0	ug/L	6/22/00	8270
4-Chloro-3-Methylphenol	< 10.0	ug/L	6/22/00	8270
2-Methylnaphthalene	< 5.0	ug/L	6/22/00	8270
Hexachlorocyclopentadiene	< 5.0	ug/L	6/22/00	8270
2,4,6-Trichlorophenol	< 10.0	ug/L	6/22/00	8270
2,4,5-Trichlorophenol	< 5.0	ug/L	6/22/00	8270
2-Chloronaphthalene	< 10.0	ug/L	6/22/00	8270

Lab Number: 00-D1591
Sample Number: 0004549
July 26, 2000

Analysis Performed	Results		Analyzed	Method
2-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Dimethylphthalate	< 5.0	ug/L	6/22/00	8270
Acenaphthylene	< 5.0	ug/L	6/22/00	8270
2,6-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
3-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Acenaphthene	< 5.0	ug/L	6/22/00	8270
2,4-Dinitrophenol	< 15.0	ug/L	6/22/00	8270
4-Nitrophenol	< 10.0	ug/L	6/22/00	8270
Dibenzofuran	< 5.0	ug/L	6/22/00	8270
2,4-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
Diethylphthalate	< 5.0	ug/L	6/22/00	8270
4-Chlorophenyl-phenylethe	< 5.0	ug/L	6/22/00	8270
Fluorene	< 5.0	ug/L	6/22/00	8270
4-Nitroaniline	< 10.0	ug/L	6/22/00	8270
4,6-Dinitro-2-Methylpheno	< 10.0	ug/L	6/22/00	8270
N-Nitrosodiphenylamine	< 5.0	ug/L	6/22/00	8270
4-Bromophenyl-phenylether	< 5.0	ug/L	6/22/00	8270
Hexachlorobenzene	< 5.0	ug/L	6/22/00	8270
Pentachlorophenol	< 10.0	ug/L	6/22/00	8270
Phenanthrene	< 5.0	ug/L	6/22/00	8270
Anthracene	< 5.0	ug/L	6/22/00	8270
)i-n-Butylphthalate	< 5.0	ug/L	6/22/00	8270
Fluoranthene	< 5.0	ug/L	6/22/00	8270
Pyrene	< 10.0	ug/L	6/22/00	8270
Butylbenzylphthalate	< 5.0	ug/L	6/22/00	8270
3-3'-Dichlorobenzidine	< 10.0	ug/L	6/22/00	8270
Benzo(a)anthracene	< 5.0	ug/L	6/22/00	8270
Chrysene	< 5.0	ug/L	6/22/00	8270
bis(2-ethylhexyl)phthalat	< 5.0	ug/L	6/22/00	8270
Di-n-Octylphthalate	< 20.0	ug/L	6/22/00	8270
Benzo(b)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(k)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(a)pyrene	< 5.0	ug/L	6/22/00	8270
Indeno(1,2,3-cd)pyrene	< 5.0	ug/L	6/22/00	8270
Dibenz(a,h)anthracene	< 5.0	ug/L	6/22/00	8270
Benzo(g,h,i)perylene	< 5.0	ug/L	6/22/00	8270
Pesticide Results:				
Alpha - BHC	< 0.05	ug/L	7/ 7/00	8080A
Beta - BHC	< 0.05	ug/L	7/ 7/00	8080A
Gamma - BHC (Lindane)	< 0.05	ug/L	7/ 7/00	8080A
Delta - BHC	12.5	ug/L	7/ 7/00	8080A
Heptachlor	< 0.05	ug/L	7/ 7/00	8080A
Aldrin	< 0.05	ug/L	7/ 7/00	8080A
Heptachlor Epoxide	17.3	ug/L	7/ 7/00	8080A
Alpha - Endosulfan	< 0.05	ug/L	7/ 7/00	8080A
ieldrin	< 0.05	ug/L	7/ 7/00	8080A
DE	0.19	ug/L	7/ 7/00	8080A

Analysis Performed	Results		Analyzed	Method
Endrin	< 0.05	ug/L	7/ 7/00	8080A
Beta-Endosulfan	0.28	ug/L	7/ 7/00	8080A
DDD	< 0.05	ug/L	7/ 7/00	8080A
Endrin Aldehyde	< 0.05	ug/L	7/ 7/00	8080A
Endosulfan Sulfate	< 0.05	ug/L	7/ 7/00	8080A
DDT	< 0.05	ug/L	7/ 7/00	8080A
Methoxychlor	< 0.05	ug/L	7/ 7/00	8080A
Chlordane	< 0.50	ug/L	7/ 7/00	8080A
Toxaphene	< 1.00	ug/L	7/ 7/00	8080A

VOA Comments:
1.) A 1:2500 dilution was analyzed on 6/20/00 to quantitate Chlorobenzene.
2.) A 1:20 dilution was analyzed on 6/16/00 to quantitate the remaining target compounds due to matrix interference.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

RECEIVED

2000

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0004553
Lab Number: 00-D1595

Reported To: LARRY LEHMAN
Affiliation: ESP
Project Code: 4908/3000

Report Date: 7/26/00
Date Collected: 6/15/00
Date Received: 6/15/00

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: SOLUTIA QUEENY PLANT, ST. LOUIS, MO
Sample Description: TRIP BLANK

Analysis Performed	Results		Analyzed	Method
VOA Results:				
Chloromethane	< 20.0	ug/L	6/16/00	8260
Vinyl Chloride	< 1.0	ug/L	6/16/00	8260
Bromomethane	< 5.0	ug/L	6/16/00	8260
Chloroethane	< 5.0	ug/L	6/16/00	8260
1,1-Dichloroethene	< 1.0	ug/L	6/16/00	8260
Acetone	< 20.0	ug/L	6/16/00	8260
Carbon Disulfide	< 1.0	ug/L	6/16/00	8260
Methylene Chloride	< 20.0	ug/L	6/16/00	8260
Methyl Tert-Butyl Ether	< 2.0	ug/L	6/16/00	8260
trans-1,2-Dichloroethene	< 1.0	ug/L	6/16/00	8260
1,1-Dichloroethane	< 1.0	ug/L	6/16/00	8260
2-Butanone	< 5.0	ug/L	6/16/00	8260
cis-1,2-Dichloroethene	< 1.0	ug/L	6/16/00	8260
Chloroform	< 1.0	ug/L	6/16/00	8260
1,1,1-Trichloroethane	< 1.0	ug/L	6/16/00	8260
Carbon Tetrachloride	< 1.0	ug/L	6/16/00	8260
Benzene	< 1.0	ug/L	6/16/00	8260
1,2-Dichloroethane	< 1.0	ug/L	6/16/00	8260
Trichloroethene	< 1.0	ug/L	6/16/00	8260
1,2-Dichloropropane	< 1.0	ug/L	6/16/00	8260
Bromodichloromethane	< 1.0	ug/L	6/16/00	8260
2-Hexanone	< 2.0	ug/L	6/16/00	8260
Trans-1,3-Dichloropropene	< 1.0	ug/L	6/16/00	8260
Toluene	< 1.0	ug/L	6/16/00	8260

Recycled Paper

Lab Number: 00-D1595
Sample Number: 0004553
July 26, 2000

Analysis Performed	Results		Analyzed	Method
CIS-1,3-Dichloropropene	< 1.0	ug/L	6/16/00	8260
1,1,2-Trichloroethane	< 1.0	ug/L	6/16/00	8260
4-Methyl-2-Pentanone	< 1.0	ug/L	6/16/00	8260
Tetrachloroethene	< 1.0	ug/L	6/16/00	8260
Dibromochloromethane	< 1.0	ug/L	6/16/00	8260
Chlorobenzene	< 1.0	ug/L	6/16/00	8260
Ethylbenzene	< 1.0	ug/L	6/16/00	8260
Total Xylenes	< 2.0	ug/L	6/16/00	8260
Styrene	< 1.0	ug/L	6/16/00	8260
Bromoform	< 1.0	ug/L	6/16/00	8260
1,1,2,2-Tetrachloroethane	< 1.0	ug/L	6/16/00	8260
1,3-Dichlorobenzene	< 1.0	ug/L	6/16/00	8260
1,4-Dichlorobenzene	< 1.0	ug/L	6/16/00	8260
1,2-Dichlorobenzene	< 1.0	ug/L	6/16/00	8260
Diethyl Ether	< 20.0	ug/L	6/16/00	8260
Iodomethane	< 5.0	ug/L	6/16/00	8260
Acrylonitrile	< 2.0	ug/L	6/16/00	8260
Allyl Chloride	< 1.0	ug/L	6/16/00	8260
Propionitrile	< 20.0	ug/L	6/16/00	8260
Methacrylonitrile	< 1.0	ug/L	6/16/00	8260
Methyl Acrylate	< 10.0	ug/L	6/16/00	8260
Tetrahydrofuran	< 5.0	ug/L	6/16/00	8260
1-Chlorobutane	< 1.0	ug/L	6/16/00	8260
Chloroacetonitrile	< 2.0	ug/L	6/16/00	8260
2-Nitropropane	< 1.0	ug/L	6/16/00	8260
Methylmethacrylate	< 1.0	ug/L	6/16/00	8260
1,1-Dichloropropanone	< 2.0	ug/L	6/16/00	8260
Ethyl Methacrylate	< 1.0	ug/L	6/16/00	8260
t-1,4-Dichloro-2-butene	< 1.0	ug/L	6/16/00	8260
Pentachloroethane	< 1.0	ug/L	6/16/00	8260
Hexachloroethane	< 1.0	ug/L	6/16/00	8260
Nitrobenzene	< 10.0	ug/L	6/16/00	8260
Dichlorodifluoromethane	< 1.0	ug/L	6/16/00	8260
Trichlorofluoromethane	< 5.0	ug/L	6/16/00	8260
2,2-Dichloropropane	< 1.0	ug/L	6/16/00	8260
Bromochloromethane	< 1.0	ug/L	6/16/00	8260
1,1-Dichloropropene	< 1.0	ug/L	6/16/00	8260
Dibromomethane	< 1.0	ug/L	6/16/00	8260
1,3-Dichloropropane	< 1.0	ug/L	6/16/00	8260
1,2-Dibromoethane	< 1.0	ug/L	6/16/00	8260
1,1,1,2-Tetrachloroethane	< 1.0	ug/L	6/16/00	8260
Isopropylbenzene	< 1.0	ug/L	6/16/00	8260
1,2,3-Trichloropropane	< 1.0	ug/L	6/16/00	8260
n-Propylbenzene	< 1.0	ug/L	6/16/00	8260
Bromobenzene	< 1.0	ug/L	6/16/00	8260
2-Chlorotoluene	< 1.0	ug/L	6/16/00	8260
-Chlorotoluene	< 1.0	ug/L	6/16/00	8260

Lab Number: 00-D1595
Sample Number: 0004553
July 26, 2000

Analysis Performed	Results		Analyzed	Method
1,3,5-Trimethylbenzene	< 1.0	ug/L	6/16/00	8260
tert-Butylbenzene	< 2.0	ug/L	6/16/00	8260
1,2,4-Trimethylbenzene	< 1.0	ug/L	6/16/00	8260
sec-Butylbenzene	< 1.0	ug/L	6/16/00	8260
p-isopropyltoluene	< 1.0	ug/L	6/16/00	8260
n-Butylbenzene	< 1.0	ug/L	6/16/00	8260
1,2-Dibromo-3-Chloroprop	< 1.0	ug/L	6/16/00	8260
1,2,4-Trichlorobenzene	< 1.0	ug/L	6/16/00	8260
Hexachlorobutadiene	< 2.0	ug/L	6/16/00	8260
Naphthalene	< 1.0	ug/L	6/16/00	8260
1,2,3-Trichlorobenzene	< 2.0	ug/L	6/16/00	8260
BNA Results:				
Phenol	< 5.0	ug/L	6/22/00	8270
bis(-2-Chloroethyl)Ether	< 5.0	ug/L	6/22/00	8270
2-Chlorophenol	< 10.0	ug/L	6/22/00	8270
1,3-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
1,4-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
N-nitrosodimethylamine	< 5.0	ug/L	6/22/00	8270
1,2-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
2-Methylphenol	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroisopropyl)Eth	< 5.0	ug/L	6/22/00	8270
4-Methylphenol	< 5.0	ug/L	6/22/00	8270
N-Nitro-Di-n-Propylamine	< 5.0	ug/L	6/22/00	8270
Hexachloroethane	< 5.0	ug/L	6/22/00	8270
Nitrobenzene	< 5.0	ug/L	6/22/00	8270
Isophorone	< 5.0	ug/L	6/22/00	8270
2-Nitrophenol	< 10.0	ug/L	6/22/00	8270
2,4-Dimethylphenol	< 5.0	ug/L	6/22/00	8270
Benzoic Acid	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroethoxy)Methan	< 5.0	ug/L	6/22/00	8270
2,4-Dichlorophenol	< 5.0	ug/L	6/22/00	8270
1,2,4-Trichlorobenzene	< 5.0	ug/L	6/22/00	8270
Naphthalene	< 5.0	ug/L	6/22/00	8270
4-Chloroaniline	< 10.0	ug/L	6/22/00	8270
Hexachlorobutadiene	< 5.0	ug/L	6/22/00	8270
4-Chloro-3-Methylphenol	< 10.0	ug/L	6/22/00	8270
2-Methylnaphthalene	< 5.0	ug/L	6/22/00	8270
Hexachlorocyclopentadiene	< 5.0	ug/L	6/22/00	8270
2,4,6-Trichlorophenol	< 10.0	ug/L	6/22/00	8270
2,4,5-Trichlorophenol	< 5.0	ug/L	6/22/00	8270
2-Chloronaphthalene	< 10.0	ug/L	6/22/00	8270
2-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Dimethylphthalate	< 5.0	ug/L	6/22/00	8270
Acenaphthylene	< 5.0	ug/L	6/22/00	8270
2,6-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
3-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Acenaphthene	< 5.0	ug/L	6/22/00	8270

Lab Number: 00-D1595
Sample Number: 0004553
July 26, 2000

Analysis Performed	Results		Analyzed	Method
2,4-Dinitrophenol	< 15.0	ug/L	6/22/00	8270
4-Nitrophenol	< 10.0	ug/L	6/22/00	8270
Dibenzofuran	< 5.0	ug/L	6/22/00	8270
2,4-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
Diethylphthalate	< 5.0	ug/L	6/22/00	8270
4-Chlorophenyl-phenylethe	< 5.0	ug/L	6/22/00	8270
Fluorene	< 5.0	ug/L	6/22/00	8270
4-Nitroaniline	< 10.0	ug/L	6/22/00	8270
4,6-Dinitro-2-Methylpheno	< 10.0	ug/L	6/22/00	8270
N-Nitrosodiphenylamine	< 5.0	ug/L	6/22/00	8270
4-Bromophenyl-phenylether	< 5.0	ug/L	6/22/00	8270
Hexachlorobenzene	< 5.0	ug/L	6/22/00	8270
Pentachlorophenol	< 10.0	ug/L	6/22/00	8270
Phenanthrene	< 5.0	ug/L	6/22/00	8270
Anthracene	< 5.0	ug/L	6/22/00	8270
Di-n-Butylphthalate	< 5.0	ug/L	6/22/00	8270
Fluoranthene	< 5.0	ug/L	6/22/00	8270
Pyrene	< 10.0	ug/L	6/22/00	8270
Butylbenzylphthalate	< 5.0	ug/L	6/22/00	8270
3-3'-Dichlorobenzidine	< 10.0	ug/L	6/22/00	8270
Benzo(a)anthracene	< 5.0	ug/L	6/22/00	8270
Chrysene	< 5.0	ug/L	6/22/00	8270
bis(2-ethylhexyl)phthalat	< 5.0	ug/L	6/22/00	8270
Di-n-Octylphthalate	< 20.0	ug/L	6/22/00	8270
Benzo(b)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(k)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(a)pyrene	< 5.0	ug/L	6/22/00	8270
Indeno(1,2,3-cd)pyrene	< 5.0	ug/L	6/22/00	8270
Dibenz(a,h)anthracene	< 5.0	ug/L	6/22/00	8270
Benzo(g,h,i)perylene	< 5.0	ug/L	6/22/00	8270
Pesticide Results:				
Alpha - BHC	< 0.05	ug/L	7/ 7/00	8080A
Beta - BHC	< 0.05	ug/L	7/ 7/00	8080A
Gamma - BHC (Lindane)	< 0.05	ug/L	7/ 7/00	8080A
Delta - BHC	< 0.05	ug/L	7/ 7/00	8080A
Heptachlor	< 0.05	ug/L	7/ 7/00	8080A
Aldrin	< 0.05	ug/L	7/ 7/00	8080A
Heptachlor Epoxide	< 0.05	ug/L	7/ 7/00	8080A
Alpha - Endosulfan	< 0.05	ug/L	7/ 7/00	8080A
Dieldrin	< 0.05	ug/L	7/ 7/00	8080A
DDE	< 0.05	ug/L	7/ 7/00	8080A
Endrin	< 0.05	ug/L	7/ 7/00	8080A
Beta-Endosulfan	< 0.05	ug/L	7/ 7/00	8080A
DDD	< 0.05	ug/L	7/ 7/00	8080A
Endrin Aldehyde	< 0.05	ug/L	7/ 7/00	8080A
Endosulfan Sulfate	< 0.05	ug/L	7/ 7/00	8080A
DDT	< 0.05	ug/L	7/ 7/00	8080A

Analysis Performed	Results		Analyzed	Method
Methoxychlor	< 0.05	ug/L	7/ 7/00	8080A
Chlordane	< 0.50	ug/L	7/ 7/00	8080A
Toxaphene	< 1.00	ug/L	7/ 7/00	8080A

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI

Mel Carnahan, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0004551
Lab Number: 00-D1593

Reported To:	LARRY LEHMAN	Report Date:	6/29/00
Affiliation:	ESP	Date Collected:	6/14/00
Project Code:	4908/3000	Date Received:	6/15/00

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: SOLUTIA QUEENY PLANT, ST. LOUIS, MO
Sample Description: DUPLICATE OF 0004550

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	7.29	umhos/cm	6/14/00	120.1
Comment: Analyzed in field				
pH	6.74		6/14/00	150.1
Comment: Analyzed in field				
Temperature - C	20	Degrees C	6/14/00	
Comment: Analyzed in field				
VOA Results:				
Chloromethane	< 400	ug/L	6/19/00	8260
Vinyl Chloride	< 20.0	ug/L	6/19/00	8260
Bromomethane	< 100	ug/L	6/19/00	8260
Chloroethane	< 100	ug/L	6/19/00	8260
1,1-Dichloroethene	< 20.0	ug/L	6/19/00	8260
Acetone	< 400	ug/L	6/19/00	8260
Carbon Disulfide	< 20.0	ug/L	6/19/00	8260
Methylene Chloride	< 400	ug/L	6/19/00	8260
Methyl Tert-Butyl Ether	< 40.0	ug/L	6/19/00	8260
trans-1,2-Dichloroethene	< 20.0	ug/L	6/19/00	8260
1,1-Dichloroethane	< 20.0	ug/L	6/19/00	8260
2-Butanone	< 100	ug/L	6/19/00	8260
cis-1,2-Dichloroethene	475	ug/L	6/19/00	8260
Chloroform	< 20.0	ug/L	6/19/00	8260
1,1,1-Trichloroethane	< 20.0	ug/L	6/19/00	8260
Carbon Tetrachloride	< 20.0	ug/L	6/19/00	8260
Benzene	< 20.0	ug/L	6/19/00	8260
1,2-Dichloroethane	< 20.0	ug/L	6/19/00	8260

Lab Number: 00-D1593
Sample Number: 0004551
June 29, 2000

Analysis Performed	Results		Analyzed	Method
Trichloroethene	160	ug/L	6/19/00	8260
1,2-Dichloropropane	< 20.0	ug/L	6/19/00	8260
Bromodichloromethane	< 20.0	ug/L	6/19/00	8260
2-Hexanone	< 40.0	ug/L	6/19/00	8260
Trans-1,3-Dichloropropene	< 20.0	ug/L	6/19/00	8260
Toluene	< 20.0	ug/L	6/19/00	8260
CIS-1,3-Dichloropropene	< 20.0	ug/L	6/19/00	8260
1,1,2-Trichloroethane	< 20.0	ug/L	6/19/00	8260
4-Methyl-2-Pentanone	< 20.0	ug/L	6/19/00	8260
Tetrachloroethene	396	ug/L	6/19/00	8260
Dibromochloromethane	< 20.0	ug/L	6/19/00	8260
Chlorobenzene	146	ug/L	6/19/00	8260
Ethylbenzene	< 20.0	ug/L	6/19/00	8260
Total Xylenes	< 40.0	ug/L	6/19/00	8260
Styrene	< 20.0	ug/L	6/19/00	8260
Bromoform	< 20.0	ug/L	6/19/00	8260
1,1,2,2-Tetrachloroethane	< 20.0	ug/L	6/19/00	8260
1,3-Dichlorobenzene	< 20.0	ug/L	6/19/00	8260
1,4-Dichlorobenzene	< 20.0	ug/L	6/19/00	8260
1,2-Dichlorobenzene	< 20.0	ug/L	6/19/00	8260
Diethyl Ether	< 400	ug/L	6/19/00	8260
Iodomethane	< 100	ug/L	6/19/00	8260
Acrylonitrile	< 40.0	ug/L	6/19/00	8260
Allyl Chloride	< 20.0	ug/L	6/19/00	8260
Propionitrile	< 400	ug/L	6/19/00	8260
Methacrylonitrile	< 20.0	ug/L	6/19/00	8260
Methyl Acrylate	< 200	ug/L	6/19/00	8260
Tetrahydrofuran	< 100	ug/L	6/19/00	8260
1-Chlorobutane	< 20.0	ug/L	6/19/00	8260
Chloroacetonitrile	< 40.0	ug/L	6/19/00	8260
2-Nitropropane	< 20.0	ug/L	6/19/00	8260
Methylmethacrylate	< 20.0	ug/L	6/19/00	8260
1,1-Dichloropropanone	< 40.0	ug/L	6/19/00	8260
Ethyl Methacrylate	< 20.0	ug/L	6/19/00	8260
t-1,4-Dichloro-2-butene	< 20.0	ug/L	6/19/00	8260
Pentachloroethane	< 20.0	ug/L	6/19/00	8260
Hexachloroethane	< 20.0	ug/L	6/19/00	8260
Nitrobenzene	< 200	ug/L	6/19/00	8260
Dichlorodifluoromethane	< 20.0	ug/L	6/19/00	8260
Trichlorofluoromethane	< 100	ug/L	6/19/00	8260
2,2-Dichloropropane	< 20.0	ug/L	6/19/00	8260
Bromochloromethane	< 20.0	ug/L	6/19/00	8260
1,1-Dichloropropene	< 20.0	ug/L	6/19/00	8260
Dibromomethane	< 20.0	ug/L	6/19/00	8260
1,3-Dichloropropane	< 20.0	ug/L	6/19/00	8260
,2-Dibromoethane	< 20.0	ug/L	6/19/00	8260
,1,1,2-Tetrachloroethane	< 20.0	ug/L	6/19/00	8260

Analysis Performed	Results		Analyzed	Method
Isopropylbenzene	< 20.0	ug/L	6/19/00	8260
1,2,3-Trichloropropane	< 20.0	ug/L	6/19/00	8260
n-Propylbenzene	< 20.0	ug/L	6/19/00	8260
Bromobenzene	< 20.0	ug/L	6/19/00	8260
2-Chlorotoluene	< 20.0	ug/L	6/19/00	8260
4-Chlorotoluene	< 20.0	ug/L	6/19/00	8260
1,3,5-Trimethylbenzene	< 20.0	ug/L	6/19/00	8260
tert-Butylbenzene	< 40.0	ug/L	6/19/00	8260
1,2,4-Trimethylbenzene	< 20.0	ug/L	6/19/00	8260
sec-Butylbenzene	< 20.0	ug/L	6/19/00	8260
p-isopropyltoluene	< 20.0	ug/L	6/19/00	8260
n-Butylbenzene	< 20.0	ug/L	6/19/00	8260
1,2-Dibromo-3-Chloroprop	< 20.0	ug/L	6/19/00	8260
1,2,4-Trichlorobenzene	< 20.0	ug/L	6/19/00	8260
Hexachlorobutadiene	< 40.0	ug/L	6/19/00	8260
Naphthalene	< 20.0	ug/L	6/19/00	8260
1,2,3-Trichlorobenzene	< 40.0	ug/L	6/19/00	8260
BNA Results:				
Phenol	< 5.0	ug/L	6/22/00	8270
bis(-2-Chloroethyl)Ether	< 5.0	ug/L	6/22/00	8270
2-Chlorophenol	< 10.0	ug/L	6/22/00	8270
1,3-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
1,4-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
N-nitrosodimethylamine	< 5.0	ug/L	6/22/00	8270
1,2-Dichlorobenzene	< 5.0	ug/L	6/22/00	8270
2-Methylphenol	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroisopropyl)Eth	< 5.0	ug/L	6/22/00	8270
4-Methylphenol	< 5.0	ug/L	6/22/00	8270
N-Nitro-Di-n-Propylamine	< 5.0	ug/L	6/22/00	8270
Hexachloroethane	< 5.0	ug/L	6/22/00	8270
Nitrobenzene	< 5.0	ug/L	6/22/00	8270
Isophorone	< 5.0	ug/L	6/22/00	8270
2-Nitrophenol	< 10.0	ug/L	6/22/00	8270
2,4-Dimethylphenol	< 5.0	ug/L	6/22/00	8270
Benzoic Acid	< 5.0	ug/L	6/22/00	8270
bis(2-Chloroethoxy)Methan	< 5.0	ug/L	6/22/00	8270
2,4-Dichlorophenol	< 5.0	ug/L	6/22/00	8270
1,2,4-Trichlorobenzene	< 5.0	ug/L	6/22/00	8270
Naphthalene	< 5.0	ug/L	6/22/00	8270
4-Chloroaniline	< 10.0	ug/L	6/22/00	8270
Hexachlorobutadiene	< 5.0	ug/L	6/22/00	8270
4-Chloro-3-Methylphenol	< 10.0	ug/L	6/22/00	8270
2-Methylnaphthalene	< 5.0	ug/L	6/22/00	8270
Hexachlorocyclopentadiene	< 5.0	ug/L	6/22/00	8270
2,4,6-Trichlorophenol	< 10.0	ug/L	6/22/00	8270
,4,5-Trichlorophenol	< 5.0	ug/L	6/22/00	8270
-Chloronaphthalene	< 10.0	ug/L	6/22/00	8270

Lab Number: 00-D1593
Sample Number: 0004551
June 29, 2000

Analysis Performed	Results		Analyzed	Method
2-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Dimethylphthalate	< 5.0	ug/L	6/22/00	8270
Acenaphthylene	< 5.0	ug/L	6/22/00	8270
2,6-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
3-Nitroaniline	< 10.0	ug/L	6/22/00	8270
Acenaphthene	< 5.0	ug/L	6/22/00	8270
2,4-Dinitrophenol	< 15.0	ug/L	6/22/00	8270
4-Nitrophenol	< 10.0	ug/L	6/22/00	8270
Dibenzofuran	< 5.0	ug/L	6/22/00	8270
2,4-Dinitrotoluene	< 5.0	ug/L	6/22/00	8270
Diethylphthalate	< 5.0	ug/L	6/22/00	8270
4-Chlorophenyl-phenylethe	< 5.0	ug/L	6/22/00	8270
Fluorene	< 5.0	ug/L	6/22/00	8270
4-Nitroaniline	< 10.0	ug/L	6/22/00	8270
4,6-Dinitro-2-Methylpheno	< 10.0	ug/L	6/22/00	8270
N-Nitrosodiphenylamine	< 5.0	ug/L	6/22/00	8270
4-Bromophenyl-phenylether	< 5.0	ug/L	6/22/00	8270
Hexachlorobenzene	< 5.0	ug/L	6/22/00	8270
Pentachlorophenol	< 10.0	ug/L	6/22/00	8270
Phenanthrene	< 5.0	ug/L	6/22/00	8270
Anthracene	< 5.0	ug/L	6/22/00	8270
Di-n-Butylphthalate	< 5.0	ug/L	6/22/00	8270
Fluoranthene	< 5.0	ug/L	6/22/00	8270
Pyrene	< 10.0	ug/L	6/22/00	8270
Butylbenzylphthalate	< 5.0	ug/L	6/22/00	8270
3-3'-Dichlorobenzidine	< 10.0	ug/L	6/22/00	8270
Benzo(a)anthracene	< 5.0	ug/L	6/22/00	8270
Chrysene	< 5.0	ug/L	6/22/00	8270
bis(2-ethylhexyl)phthalat	< 5.0	ug/L	6/22/00	8270
Di-n-Octylphthalate	< 20.0	ug/L	6/22/00	8270
Benzo(b)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(k)fluoranthene	< 5.0	ug/L	6/22/00	8270
Benzo(a)pyrene	< 5.0	ug/L	6/22/00	8270
Indeno(1,2,3-cd)pyrene	< 5.0	ug/L	6/22/00	8270
Dibenz(a,h)anthracene	< 5.0	ug/L	6/22/00	8270
Benzo(g,h,i)perylene	< 5.0	ug/L	6/22/00	8270

VOA Comments:
A 1:20 dilution was analyzed to quantitate the target compounds due to matrix interference.

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long

James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: KATHY FLIPPIN, HWP

Appendix K

Groundwater Monitoring Results

UKHT 1

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
GM-1	06/20/2000	Silts & Clays	8141	Alachlor	130000	ug/l		
GM-1	06/20/2000	Silts & Clays	8260	Chlorobenzene	180000	ug/l	D	
GM-2	06/30/2000	Silts & Clays	8260	Chlorobenzene	70000	ug/l		
GM-2	06/30/2000	Silts & Clays	8260	Ethyl methacrylate	1400	ug/l	J	
GM-3	07/06/2000	Silts & Clays	8141	Alachlor	9.9	ug/l	P	J
GM-3	07/06/2000	Silts & Clays	8260	Chlorobenzene	5900	ug/l		
HW-1	07/24/2000	Sand	8260	cis/trans-1,2-Dichloroethene	1700	ug/l	D	
HW-1	07/24/2000	Sand	8260	Tetrachloroethene	2.7	ug/l	J	
HW-1	07/24/2000	Sand	8260	Trichloroethene	74	ug/l		
HW-1	07/24/2000	Sand	8260	Vinyl chloride	3.8	ug/l		
HW-1 Dup	07/24/2000	Sand	8260	1,1,1-Trichloroethane	23	ug/l		J
HW-1 Dup	07/24/2000	Sand	8260	Chlorobenzene	2.1	ug/l	J	
HW-1 Dup	07/24/2000	Sand	8260	cis/trans-1,2-Dichloroethene	1000	ug/l	D	
HW-1 Dup	07/24/2000	Sand	8260	Toluene	2.1	ug/l	J	
HW-1 Dup	07/24/2000	Sand	8260	Trichloroethene	44	ug/l		
HW-1 Dup	07/24/2000	Sand	8260	Vinyl chloride	2.2	ug/l		
HW-1b	06/29/2000	Sand	8260	cis/trans-1,2-Dichloroethene	880	ug/l		
HW-1b	06/29/2000	Sand	8260	Tetrachloroethene	38	ug/l		
HW-1b	06/29/2000	Sand	8260	Trichloroethene	590	ug/l		
HW-2	07/26/2000	Silts & Clays	8260	1,1,1-Trichloroethane	61	ug/l		
HW-2	07/26/2000	Silts & Clays	8260	Benzene	6.8	ug/l		J
HW-2	07/26/2000	Silts & Clays	8260	Chlorobenzene	3.5	ug/l	J	
HW-2	07/26/2000	Silts & Clays	8260	Chloroform	2.2	ug/l	J	
HW-2	07/26/2000	Silts & Clays	8260	Chloromethane	3.6	ug/l	J	
HW-2	07/26/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	1100	ug/l	D	
HW-2	07/26/2000	Silts & Clays	8260	Tetrachloroethene	9.6	ug/l		
HW-2	07/26/2000	Silts & Clays	8260	Trichloroethene	16000	ug/l	D	
HW-2	07/26/2000	Silts & Clays	8260	Vinyl chloride	1.1	ug/l		
LPZ-1	07/14/2000	Silts & Clays	8260	Benzene	68	ug/l	J	
LPZ-1	07/14/2000	Silts & Clays	8260	Chlorobenzene	660	ug/l		
LPZ-1	07/14/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	19000	ug/l		
LPZ-1	07/14/2000	Silts & Clays	8260	Tetrachloroethene	170	ug/l	J	
LPZ-1	07/14/2000	Silts & Clays	8260	Toluene	310000	ug/l	D	
LPZ-1	07/14/2000	Silts & Clays	8260	Trichloroethene	3200	ug/l		
LPZ-1	07/14/2000	Silts & Clays	8260	Vinyl chloride	2500	ug/l		
LPZ-2	06/27/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	820	ug/l		
LPZ-2	06/27/2000	Silts & Clays	8260	Methylene chloride	1500	ug/l	JB	J
LPZ-2	06/27/2000	Silts & Clays	8260	Toluene	70000	ug/l		
LPZ-2	06/27/2000	Silts & Clays	8260	Vinyl chloride	460	ug/l		
LPZ-3	07/27/2000	Silts & Clays	8260	Benzene	66	ug/l	J	
LPZ-3	07/27/2000	Silts & Clays	8260	Chlorobenzene	130	ug/l	J	
LPZ-3	07/27/2000	Silts & Clays	8260	Methylene chloride	18	ug/l	JB	J
LPZ-3	07/27/2000	Silts & Clays	8260	Toluene	4200	ug/l		
LPZ-4	08/01/2000	Silts & Clays	8260	Benzene	770	ug/l	J	J
LPZ-4	08/01/2000	Silts & Clays	8260	Chlorobenzene	2300	ug/l	J	
LPZ-4	08/01/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	4100	ug/l		
LPZ-4	08/01/2000	Silts & Clays	8260	Tetrachloroethene	3800	ug/l		
LPZ-4	08/01/2000	Silts & Clays	8260	Toluene	660000	ug/l	D	
LPZ-4	08/01/2000	Silts & Clays	8260	Trichloroethene	3100	ug/l		
LPZ-4	08/01/2000	Silts & Clays	8260	Vinyl chloride	2400	ug/l		
LPZ-5	07/14/2000	Silts & Clays	8260	Benzene	300	ug/l	J	
LPZ-5	07/14/2000	Silts & Clays	8260	Chlorobenzene	15000	ug/l		
LPZ-5	07/14/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	750	ug/l	J	
LPZ-5	07/14/2000	Silts & Clays	8260	Toluene	170000	ug/l		
LPZ-5	07/14/2000	Silts & Clays	8260	Vinyl chloride	840	ug/l		
MW-2A	07/25/2000	Sand	6010	Arsenic	0.0041	mg/l	B	
MW-2A	07/25/2000	Sand	6010	Barium	0.16	mg/l		
MW-2A	07/25/2000	Sand	6010	Cadmium	0.00097	mg/l	B	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-2A	07/25/2000	Sand	6010	Chromium	0.0028	mg/l	B	
MW-2A	07/25/2000	Sand	6010	Cobalt	0.0019	mg/l	B	
MW-2A	07/25/2000	Sand	6010	Copper	0.011	mg/l	B	
MW-2A	07/25/2000	Sand	6010	Lead	0.0058	mg/l		
MW-2A	07/25/2000	Sand	6010	Nickel	0.0068	mg/l	B	
MW-2A	07/25/2000	Sand	6010	Vanadium	0.0064	mg/l	B	
MW-2A	07/25/2000	Sand	6010	Zinc	0.044	mg/l		
MW-2A	07/25/2000	Sand	8260	Tetrachloroethene	3.2	ug/l	J	
MW-2A	07/25/2000	Sand	8260	Toluene	0.88	ug/l	J	
MW-2AF	07/25/2000	Sand	6010	Barium	0.073	mg/l		
MW-2AF	07/25/2000	Sand	6010	Copper	0.0092	mg/l	B	
MW-2AF	07/25/2000	Sand	6010	Zinc	0.028	mg/l		
MW-2B	07/25/2000	Silts & Clays	6010	Arsenic	0.0038	mg/l	B	
MW-2B	07/25/2000	Silts & Clays	6010	Barium	0.17	mg/l		
MW-2B	07/25/2000	Silts & Clays	6010	Cadmium	0.0018	mg/l	B	
MW-2B	07/25/2000	Silts & Clays	6010	Cobalt	0.01	mg/l		
MW-2B	07/25/2000	Silts & Clays	6010	Copper	0.0099	mg/l	B	
MW-2B	07/25/2000	Silts & Clays	6010	Lead	0.0085	mg/l		
MW-2B	07/25/2000	Silts & Clays	6010	Nickel	0.056	mg/l		
MW-2B	07/25/2000	Silts & Clays	6010	Vanadium	0.0071	mg/l	B	
MW-2B	07/25/2000	Silts & Clays	6010	Zinc	0.021	mg/l		
MW-2B	07/25/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	220	ug/l		
MW-2B	07/25/2000	Silts & Clays	8260	Vinyl chloride	18	ug/l		
MW-2BF	07/25/2000	Silts & Clays	6010	Barium	0.11	mg/l		
MW-2BF	07/25/2000	Silts & Clays	6010	Cadmium	0.0013	mg/l	B	
MW-2BF	07/25/2000	Silts & Clays	6010	Copper	0.0074	mg/l	B	
MW-2BF	07/25/2000	Silts & Clays	6010	Nickel	0.03	mg/l	B	
MW-2BF	07/25/2000	Silts & Clays	6010	Vanadium	0.0036	mg/l	B	
MW-2BF	07/25/2000	Silts & Clays	6010	Zinc	0.012	mg/l	B	
MW-2R	07/25/2000	Bedrock	6010	Barium	0.0098	mg/l	B	
MW-2R	07/25/2000	Bedrock	6010	Copper	0.0017	mg/l	B	
MW-2RF	07/25/2000	Bedrock	6010	Barium	0.007	mg/l	B	
MW-2RF	07/25/2000	Bedrock	6010	Copper	0.0012	mg/l	B	
MW-3	6/20/00	Silts & Clays	6010	Arsenic	0.006	mg/l	B	
MW-3	6/20/00	Silts & Clays	6010	Barium	0.86	mg/l		
MW-3	6/20/00	Silts & Clays	6010	Cadmium	0.0034	mg/l	B	
MW-3	6/20/00	Silts & Clays	6010	Chromium	0.015	mg/l		
MW-3	6/20/00	Silts & Clays	6010	Cobalt	0.014	mg/l		
MW-3	6/20/00	Silts & Clays	6010	Copper	0.021	mg/l		
MW-3	6/20/00	Silts & Clays	6010	Lead	0.0094	mg/l		
MW-3	6/20/00	Silts & Clays	6010	Nickel	0.039	mg/l	B	
MW-3	6/20/00	Silts & Clays	6010	Vanadium	0.03	mg/l		
MW-3	6/20/00	Silts & Clays	6010	Zinc	0.066	mg/l		
MW-3	6/20/00	Silts & Clays	8260	Benzene	0.62	ug/l	J	
MW-3	6/20/00	Silts & Clays	8260	Chlorobenzene	85	ug/l		
MW-3	6/20/00	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	400	ug/l		
MW-3	6/20/00	Silts & Clays	8260	Tetrachloroethene	310	ug/l		
MW-3	6/20/00	Silts & Clays	8260	Trichloroethene	160	ug/l		
MW-3	6/20/00	Silts & Clays	8260	Vinyl chloride	14	ug/l		
MW-3	6/20/00	Silts & Clays	8270	1,2-Dichlorobenzene	0.6	ug/l	J	
MW-3	6/20/00	Silts & Clays	8270	Benzo(a)pyrene	0.48	ug/l	J	
MW-3F	6/20/00	Silts & Clays	6010	Barium	0.76	mg/l		
MW-3F	6/20/00	Silts & Clays	6010	Cadmium	0.0038	mg/l	B	
MW-3F	6/20/00	Silts & Clays	6010	Cobalt	0.011	mg/l		
MW-3F	6/20/00	Silts & Clays	6010	Copper	0.0059	mg/l	B	
MW-3F	6/20/00	Silts & Clays	6010	Nickel	0.027	mg/l	B	
MW-3F	6/20/00	Silts & Clays	6010	Zinc	0.026	mg/l		
MW-4	07/13/2000	Sand	6010	Arsenic	0.043	mg/l		

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-4	07/13/2000	Sand	6010	Barium	0.051	mg/l		
MW-4	07/13/2000	Sand	6010	Copper	0.0091	mg/l	B	
MW-4	07/13/2000	Sand	6010	Zinc	0.0077	mg/l	BN	
MW-4	07/13/2000	Sand	8141	Alachlor	13	ug/l		
MW-4	07/13/2000	Sand	8260	Benzene	0.57	ug/l	J	
MW-4	07/13/2000	Sand	8260	Chlorobenzene	240	ug/l	D	
MW-4	07/13/2000	Sand	8270	1,2,4-Trichlorobenzene	0.44	ug/l	J	
MW-4	07/13/2000	Sand	8270	2-Chlorophenol	4.4	ug/l	J	
MW-4	07/13/2000	Sand	8270	Benzo(a)anthracene	0.39	ug/l	J	
MW-4	07/13/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	2.3	ug/l	J	
MW-4	07/13/2000	Sand	8270	Di-n-butylphthalate	0.72	ug/l	J	
MW-4	07/13/2000	Sand	8270	Di-n-octylphthalate	0.61	ug/l	J	
MW-4	07/13/2000	Sand	8270	Diethylphthalate	1.1	ug/l	J	
MW-4F	07/13/2000	Sand	6010	Arsenic	0.023	mg/l		
MW-4F	07/13/2000	Sand	6010	Barium	0.043	mg/l		
MW-4 DUP	07/13/2000	Sand	6010	Arsenic	0.039	mg/l		
MW-4 DUP	07/13/2000	Sand	6010	Barium	0.047	mg/l		
MW-4 DUP	07/13/2000	Sand	6010	Copper	0.0079	mg/l	B	
MW-4 DUP	07/13/2000	Sand	6010	Zinc	0.007	mg/l	BN	
MW-4 DUP	07/13/2000	Sand	8141	Alachlor	12	ug/l		
MW-4 DUP	07/13/2000	Sand	8260	Benzene	0.67	ug/l	J	
MW-4 DUP	07/13/2000	Sand	8260	Chlorobenzene	300	ug/l	D	
MW-4 DUP	07/13/2000	Sand	8270	2-Chlorophenol	1.6	ug/l	J	
MW-4 DUP	07/13/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	2.1	ug/l	J	
MW-4 DUP	07/13/2000	Sand	8270	Di-n-butylphthalate	1	ug/l	J	
MW-4 DUP	07/13/2000	Sand	8270	Diethylphthalate	0.48	ug/l	J	
MW-4 DUP	07/13/2000	Sand	8270	Phenol	0.73	ug/l	J	
MW-4 DUPF	07/13/2000	Sand	6010	Arsenic	0.023	mg/l		
MW-4 DUPF	07/13/2000	Sand	6010	Barium	0.038	mg/l		
MW-5	6/21/00	Silts & Clays	8141	Alachlor	6	ug/l		
MW-5	6/21/00	Silts & Clays	8260	Chlorobenzene	4	ug/l	J	
MW-5	6/21/00	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	2.2	ug/l	J	
MW-5	6/21/00	Silts & Clays	8260	Vinyl chloride	0.28	ug/l	J	
MW-7A	07/21/2000	Sand	8260	Benzene	48	ug/l	J	
MW-7A	07/21/2000	Sand	8260	Chlorobenzene	3100	ug/l		
MW-7A	07/21/2000	Sand	8260	Vinyl chloride	220	ug/l		
MW-7A	07/21/2000	Sand	8270	1,2-Dichlorobenzene	11	ug/l		
MW-7A	07/21/2000	Sand	8270	1,4-Dichlorobenzene	14	ug/l		
MW-7A	07/21/2000	Sand	8270	2-Chlorophenol	24	ug/l		
MW-7A	07/21/2000	Sand	8270	2-Nitrophenol	0.45	ug/l	J	
MW-7A	07/21/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	81	ug/l	B	J
MW-7A	07/21/2000	Sand	8270	Butylbenzylphthalate	0.49	ug/l	J	
MW-7A	07/21/2000	Sand	8270	Di-n-butylphthalate	2.2	ug/l	J	
MW-7A	07/21/2000	Sand	8270	Di-n-octylphthalate	0.76	ug/l	J	
MW-7A	07/21/2000	Sand	8270	Diethylphthalate	1.3	ug/l	J	
MW-7A	07/21/2000	Sand	8270	Fluoranthene	0.48	ug/l	J	
MW-7A	07/21/2000	Sand	8270	Naphthalene	24	ug/l		
MW-7A	07/21/2000	Sand	8270	p-chloroaniline	11	ug/l	J	
MW-7A	07/21/2000	Sand	8270	Phenanthrene	0.75	ug/l	J	
MW-7B	07/20/2000	Sand	8260	Acetone	11	ug/l	J	
MW-7B	07/20/2000	Sand	8260	Chlorobenzene	32	ug/l		
MW-7B	07/20/2000	Sand	8260	Chloromethane	2.6	ug/l	J	
MW-7B	07/20/2000	Sand	8260	Tetrachloroethene	4.2	ug/l	J	J
MW-7B	07/20/2000	Sand	8260	Toluene	1.6	ug/l	J	
MW-7B	07/20/2000	Sand	8260	Xylene	7.6	ug/l	J	
MW-7B	07/20/2000	Sand	8270	1,2-Dichlorobenzene	18	ug/l		
MW-7B	07/20/2000	Sand	8270	1,4-Dichlorobenzene	270	ug/l		
MW-7B	07/20/2000	Sand	8270	2,4-Dichlorophenol	12	ug/l		

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-7B	07/20/2000	Sand	8270	2-Chlorophenol	5.5	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Benzo(a)anthracene	0.79	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Benzo(a)pyrene	0.76	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Benzo(b)fluoranthene	0.85	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Benzo(g,h,i)perylene	0.92	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Benzo(k)fluoranthene	1	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	13	ug/l	B	J
MW-7B	07/20/2000	Sand	8270	Butylbenzylphthalate	0.54	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Chrysene	0.85	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Di-n-butylphthalate	0.53	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Di-n-octylphthalate	1.1	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Dibenzofuran	2.2	ug/l	J	
MW-7B	07/20/2000	Sand	8270	Naphthalene	340	ug/l	D	
MW-7B	07/20/2000	Sand	8270	p-chloroaniline	650	ug/l	D	
MW-8A	06/29/2000	Sand	6010	Arsenic	0.017	mg/l		
MW-8A	06/29/2000	Sand	6010	Barium	0.81	mg/l		
MW-8A	06/29/2000	Sand	6010	Cadmium	0.00075	mg/l	B	
MW-8A	06/29/2000	Sand	6010	Chromium	0.0056	mg/l	B	
MW-8A	06/29/2000	Sand	6010	Copper	0.013	mg/l	B	J
MW-8A	06/29/2000	Sand	6010	Lead	0.0071	mg/l		
MW-8A	06/29/2000	Sand	6010	Nickel	0.009	mg/l	B	
MW-8A	06/29/2000	Sand	6010	Zinc	0.079	mg/l		
MW-8A	06/29/2000	Sand	8260	Benzene	16	ug/l	J	
MW-8A	06/29/2000	Sand	8260	Chlorobenzene	3400	ug/l		
MW-8A	06/29/2000	Sand	8260	Methylene chloride	58	ug/l	JB	J
MW-8A	06/29/2000	Sand	8260	Tetrachloroethene	61	ug/l	J	
MW-8A	06/29/2000	Sand	8270	1,2-Dichlorobenzene	4.6	ug/l	J	
MW-8A	06/29/2000	Sand	8270	1,4-Dichlorobenzene	5.6	ug/l	J	
MW-8A	06/29/2000	Sand	8270	2-Chlorophenol	23	ug/l		
MW-8A	06/29/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	28	ug/l	B	J
MW-8A	06/29/2000	Sand	8270	Di-n-butylphthalate	0.9	ug/l	J	
MW-8A	06/29/2000	Sand	8270	Diethylphthalate	0.63	ug/l	J	
MW-8A	06/29/2000	Sand	8270	Naphthalene	26	ug/l		
MW-8A	06/29/2000	Sand	8270	p-chloroaniline	2.3	ug/l	J	
MW-8A	06/29/2000	Sand	8270	Phenanthrene	0.72	ug/l	J	
MW-8AF	06/29/2000	Sand	6010	Arsenic	0.0059	mg/l	B	
MW-8AF	06/29/2000	Sand	6010	Barium	0.44	mg/l		
MW-8AF	06/29/2000	Sand	6010	Nickel	0.0047	mg/l	B	
MW-8AF	06/29/2000	Sand	6010	Zinc	0.0085	mg/l	B	
MW-8AF	06/29/2000	Sand	7470	Mercury	0.000084	mg/l	B	
MW-8ADUP	06/29/2000	Sand	6010	Arsenic	0.016	mg/l		
MW-8ADUP	06/29/2000	Sand	6010	Barium	0.8	mg/l		
MW-8ADUP	06/29/2000	Sand	6010	Chromium	0.0023	mg/l	B	
MW-8ADUP	06/29/2000	Sand	6010	Lead	0.0035	mg/l	B	
MW-8ADUP	06/29/2000	Sand	6010	Nickel	0.0057	mg/l	B	
MW-8ADUP	06/29/2000	Sand	6010	Thallium	0.0051	mg/l	B	
MW-8ADUP	06/29/2000	Sand	6010	Zinc	0.025	mg/l		
MW-8ADUP	06/29/2000	Sand	8260	Benzene	16	ug/l	J	
MW-8ADUP	06/29/2000	Sand	8260	Chlorobenzene	3400	ug/l		
MW-8ADUP	06/29/2000	Sand	8260	Tetrachloroethene	72	ug/l	J	
MW-8ADUP	06/29/2000	Sand	8270	1,2-Dichlorobenzene	5.9	ug/l	J	
MW-8ADUP	06/29/2000	Sand	8270	1,4-Dichlorobenzene	7.4	ug/l	J	
MW-8ADUP	06/29/2000	Sand	8270	2-Chlorophenol	33	ug/l		
MW-8ADUP	06/29/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	22	ug/l	B	J
MW-8ADUP	06/29/2000	Sand	8270	Di-n-butylphthalate	0.71	ug/l	J	
MW-8ADUP	06/29/2000	Sand	8270	Naphthalene	29	ug/l		
MW-8ADUP	06/29/2000	Sand	8270	p-chloroaniline	2.6	ug/l	J	
MW-8ADUP	06/29/2000	Sand	8270	Phenanthrene	0.5	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-8ADUP	06/29/2000	Sand	SW7470	Mercury	0.00012	mg/l	B	
MW-8ADUPF	06/29/2000	Sand	6010	Arsenic	0.0056	mg/l	B	
MW-8ADUPF	06/29/2000	Sand	6010	Barium	0.44	mg/l		
MW-8ADUPF	06/29/2000	Sand	6010	Nickel	0.0047	mg/l	B	
MW-8ADUPF	06/29/2000	Sand	6010	Zinc	0.013	mg/l	B	
MW-8B	08/01/2000	Sand	6010	Arsenic	0.0096	mg/l	B	
MW-8B	08/01/2000	Sand	6010	Barium	0.45	mg/l		
MW-8B	08/01/2000	Sand	6010	Cadmium	0.001	mg/l	B	
MW-8B	08/01/2000	Sand	6010	Chromium	0.0024	mg/l	B	
MW-8B	08/01/2000	Sand	6010	Copper	0.013	mg/l	B	
MW-8B	08/01/2000	Sand	6010	Lead	0.0078	mg/l		
MW-8B	08/01/2000	Sand	6010	Vanadium	0.0047	mg/l	B	
MW-8B	08/01/2000	Sand	6010	Zinc	0.025	mg/l		
MW-8B	08/01/2000	Sand	8260	Toluene	2.5	ug/l	J	
MW-8B	08/01/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	2.1	ug/l	J	
MW-8B	08/01/2000	Sand	8270	Di-n-butylphthalate	0.39	ug/l	J	
MW-8B	08/01/2000	Sand	8270	Di-n-octylphthalate	0.4	ug/l	J	
MW-8BF	08/01/2000	Sand	6010	Arsenic	0.0044	mg/l	B	
MW-8BF	08/01/2000	Sand	6010	Barium	0.46	mg/l		
MW-8BF	08/01/2000	Sand	6010	Copper	0.0033	mg/l	B	
MW-8BF	08/01/2000	Sand	6010	Zinc	0.011	mg/l	B	
MW-8R	07/27/2000	Bedrock	6010	Barium	0.11	mg/l		
MW-8R	07/27/2000	Bedrock	6010	Chromium	0.028	mg/l		
MW-8R	07/27/2000	Bedrock	6010	Copper	0.02	mg/l	B	
MW-8R	07/27/2000	Bedrock	6010	Lead	0.0027	mg/l	B	
MW-8R	07/27/2000	Bedrock	6010	Nickel	0.017	mg/l	B	
MW-8R	07/27/2000	Bedrock	6010	Zinc	0.021	mg/l		
MW-8R	07/27/2000	Bedrock	8260	Chlorobenzene	1.3	ug/l	J	
MW-8R	07/27/2000	Bedrock	8260	Tetrachloroethene	1.6	ug/l	J	
MW-8R	07/27/2000	Bedrock	8260	Toluene	0.82	ug/l	J	
MW-8R	07/27/2000	Bedrock	8270	Bis(2-ethylhexyl)phthalate	26	ug/l		
MW-8R	07/27/2000	Bedrock	8270	Butylbenzylphthalate	1.2	ug/l	J	
MW-8R	07/27/2000	Bedrock	8270	Di-n-butylphthalate	3.7	ug/l	J	
MW-8R	07/27/2000	Bedrock	8270	Diethylphthalate	1.1	ug/l	J	
MW-8R	07/27/2000	Bedrock	8270	Phenanthrene	0.46	ug/l	J	
MW-8RF	07/27/2000	Bedrock	6010	Barium	0.072	mg/l		
MW-8RF	07/27/2000	Bedrock	6010	Copper	0.013	mg/l	B	
MW-9	6/23/00	Silts & Clays	6010	Arsenic	0.05	mg/l		
MW-9	6/23/00	Silts & Clays	6010	Barium	0.24	mg/l		
MW-9	6/23/00	Silts & Clays	6010	Chromium	0.0089	mg/l	B	
MW-9	6/23/00	Silts & Clays	6010	Cobalt	0.003	mg/l	B	
MW-9	6/23/00	Silts & Clays	6010	Copper	0.019	mg/l	B	
MW-9	6/23/00	Silts & Clays	6010	Lead	0.0078	mg/l		
MW-9	6/23/00	Silts & Clays	6010	Nickel	0.012	mg/l	B	
MW-9	6/23/00	Silts & Clays	6010	Vanadium	0.017	mg/l		
MW-9	6/23/00	Silts & Clays	6010	Zinc	0.069	mg/l		
MW-9	6/23/00	Silts & Clays	SW9012	Cyanide, Total	0.0095	mg/l	B	
MW-9F	6/23/00	Silts & Clays	6010	Arsenic	0.01	mg/l		
MW-9F	6/23/00	Silts & Clays	6010	Barium	0.046	mg/l		
MW-9F	6/23/00	Silts & Clays	6010	Copper	0.002	mg/l	B	
MW-9F	6/23/00	Silts & Clays	6010	Thallium	0.005	mg/l	B	
MW-9F	6/23/00	Silts & Clays	6010	Zinc	0.0095	mg/l	B	
MW-10	6/22/00	Silts & Clays	6010	Arsenic	0.066	mg/l		
MW-10	6/22/00	Silts & Clays	6010	Barium	0.45	mg/l		
MW-10	6/22/00	Silts & Clays	6010	Chromium	0.0033	mg/l	B	
MW-10	6/22/00	Silts & Clays	6010	Copper	0.0087	mg/l	B	
MW-10	6/22/00	Silts & Clays	6010	Lead	0.0055	mg/l		
MW-10	6/22/00	Silts & Clays	6010	Vanadium	0.0051	mg/l	B	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-10	6/22/00	Silts & Clays	6010	Zinc	0.022	mg/l		
MW-10	6/22/00	Silts & Clays	8260	Chlorobenzene	2.7	ug/l	J	
MW-10	6/22/00	Silts & Clays	8260	Toluene	14	ug/l		
MW-10	6/22/00	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	1.4	ug/l	J	
MW-10	6/22/00	Silts & Clays	SW9012	Cyanide, Total	0.01	mg/l		
MW-10F	6/22/00	Silts & Clays	6010	Arsenic	0.03	mg/l		
MW-10F	6/22/00	Silts & Clays	6010	Barium	0.32	mg/l		
MW-10F	6/22/00	Silts & Clays	6010	Copper	0.002	mg/l	B	
MW-10F	6/22/00	Silts & Clays	6010	Tin	0.011	mg/l	B	
MW-11A	07/24/2000	Silts & Clays	6010	Arsenic	0.056	mg/l		
MW-11A	07/24/2000	Silts & Clays	6010	Barium	0.32	mg/l		
MW-11A	07/24/2000	Silts & Clays	6010	Cadmium	0.0017	mg/l	B	
MW-11A	07/24/2000	Silts & Clays	6010	Chromium	0.019	mg/l		
MW-11A	07/24/2000	Silts & Clays	6010	Cobalt	0.0058	mg/l	B	
MW-11A	07/24/2000	Silts & Clays	6010	Copper	0.067	mg/l		
MW-11A	07/24/2000	Silts & Clays	6010	Lead	0.22	mg/l		
MW-11A	07/24/2000	Silts & Clays	6010	Nickel	0.022	mg/l	B	
MW-11A	07/24/2000	Silts & Clays	6010	Tin	0.013	mg/l	B	
MW-11A	07/24/2000	Silts & Clays	6010	Vanadium	0.025	mg/l		
MW-11A	07/24/2000	Silts & Clays	6010	Zinc	0.22	mg/l		
MW-11A	07/24/2000	Silts & Clays	6010	Zinc	0.22	mg/l		
MW-11A	07/24/2000	Silts & Clays	8270	Anthracene	0.5	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Benzo(a)anthracene	1	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Benzo(a)pyrene	1	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Benzo(b)fluoranthene	0.86	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Benzo(k)fluoranthene	0.95	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Chrysene	1.1	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Fluoranthene	1.7	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	0.61	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Phenanthrene	0.74	ug/l	J	
MW-11A	07/24/2000	Silts & Clays	8270	Pyrene	1.9	ug/l	J	
MW-11AF	07/24/2000	Silts & Clays	6010	Arsenic	0.038	mg/l		
MW-11AF	07/24/2000	Silts & Clays	6010	Barium	0.15	mg/l		
MW-11B	6/20/00	Silts & Clays	6010	Arsenic	0.041	mg/l		
MW-11B	6/20/00	Silts & Clays	6010	Barium	1.1	mg/l		
MW-11B	6/20/00	Silts & Clays	6010	Chromium	0.014	mg/l		
MW-11B	6/20/00	Silts & Clays	6010	Cobalt	0.0053	mg/l	B	
MW-11B	6/20/00	Silts & Clays	6010	Copper	0.029	mg/l		
MW-11B	6/20/00	Silts & Clays	6010	Lead	0.087	mg/l		
MW-11B	6/20/00	Silts & Clays	6010	Nickel	0.012	mg/l	B	
MW-11B	6/20/00	Silts & Clays	6010	Selenium	0.0045	mg/l	B	
MW-11B	6/20/00	Silts & Clays	6010	Tin	0.0099	mg/l	B	
MW-11B	6/20/00	Silts & Clays	6010	Vanadium	0.024	mg/l		
MW-11B	6/20/00	Silts & Clays	6010	Zinc	0.12	mg/l		
MW-11B	6/20/00	Silts & Clays	8141	Alachlor	1.1	ug/l		
MW-11B	6/20/00	Silts & Clays	8260	Benzene	0.28	ug/l	J	
MW-11B	6/20/00	Silts & Clays	8260	Chlorobenzene	0.94	ug/l	J	
MW-11B	6/20/00	Silts & Clays	8270	Diethylphthalate	45	ug/l	J	
MW-11B	6/20/00	Silts & Clays	SW7470	Mercury	0.00015	mg/l	BN	
MW-11B	6/20/00	Silts & Clays	SW9012	Cyanide, Total	0.027	mg/l		
MW-11BF	6/20/00	Silts & Clays	6010	Arsenic	0.0076	mg/l	B	
MW-11BF	6/20/00	Silts & Clays	6010	Barium	0.63	mg/l		
MW-11BF	6/20/00	Silts & Clays	6010	Cobalt	0.002	mg/l	B	
MW-11BF	6/20/00	Silts & Clays	6010	Copper	0.0066	mg/l	B	
MW-11BF	6/20/00	Silts & Clays	6010	Lead	0.005	mg/l	B	
MW-11BF	6/20/00	Silts & Clays	6010	Selenium	0.0054	mg/l	B	
MW-11BF	6/20/00	Silts & Clays	6010	Tin	0.0068	mg/l	B	
MW-11BF	6/20/00	Silts & Clays	6010	Zinc	0.018	mg/l	B	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-11C	07/24/2000	Silts & Clays	8260	Chlorobenzene	4.1	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8260	Chloromethane	2.6	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8270	Acenaphthene	0.28	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8270	Benzo(a)anthracene	0.6	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8270	Benzo(a)pyrene	0.55	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8270	Benzo(b)fluoranthene	0.43	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8270	Chrysene	0.65	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8270	Fluoranthene	0.96	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8270	Phenanthrene	0.47	ug/l	J	
MW-11C	07/24/2000	Silts & Clays	8270	Pyrene	1.3	ug/l	J	
MW-13	6/19/00	Silts & Clays	6010	Arsenic	0.019	mg/l		
MW-13	6/19/00	Silts & Clays	6010	Barium	0.64	mg/l		
MW-13	6/19/00	Silts & Clays	6010	Chromium	0.012	mg/l		
MW-13	6/19/00	Silts & Clays	6010	Cobalt	0.0046	mg/l	B	
MW-13	6/19/00	Silts & Clays	6010	Copper	0.042	mg/l		
MW-13	6/19/00	Silts & Clays	6010	Lead	0.11	mg/l		
MW-13	6/19/00	Silts & Clays	6010	Nickel	0.012	mg/l	B	
MW-13	6/19/00	Silts & Clays	6010	Vanadium	0.021	mg/l		
MW-13	6/19/00	Silts & Clays	6010	Zinc	0.089	mg/l		
MW-13	6/19/00	Silts & Clays	8141	Alachlor	3.3	ug/l	N	J
MW-13	6/19/00	Silts & Clays	8260	Benzene	720	ug/l		
MW-13	6/19/00	Silts & Clays	8260	Chlorobenzene	1400	ug/l	D	J
MW-13	6/19/00	Silts & Clays	8270	Acenaphthene	3.9	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Benzo(a)anthracene	0.88	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Benzo(a)pyrene	0.97	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Benzo(g,h,i)perylene	1	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	7.5	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Chrysene	0.76	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Diethylphthalate	5.9	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Fluoranthene	2.4	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Fluorene	1.8	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	0.83	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	Naphthalene	0.55	ug/l	J	
MW-13	6/19/00	Silts & Clays	8270	p-chloroaniline	660	ug/l	D	
MW-13	6/19/00	Silts & Clays	8270	Pyrene	2.1	ug/l	J	
MW-13	6/19/00	Silts & Clays	SW7470	Mercury	0.000077	mg/l	BN	
MW-13	6/19/00	Silts & Clays	SW9012	Cyanide, Total	0.02	mg/l		
MW-13F	6/19/00	Silts & Clays	6010	Arsenic	0.0036	mg/l	B	
MW-13F	6/19/00	Silts & Clays	6010	Barium	0.41	mg/l		
MW-13F	6/19/00	Silts & Clays	6010	Copper	0.0015	mg/l	B	
MW-13F	6/19/00	Silts & Clays	6010	Lead	0.0021	mg/l	B	
MW-13 Dup	6/19/00	Silts & Clays	6010	Arsenic	0.021	mg/l		
MW-13 Dup	6/19/00	Silts & Clays	6010	Barium	0.62	mg/l		
MW-13 Dup	6/19/00	Silts & Clays	6010	Chromium	0.012	mg/l		
MW-13 Dup	6/19/00	Silts & Clays	6010	Cobalt	0.0045	mg/l	B	
MW-13 Dup	6/19/00	Silts & Clays	6010	Copper	0.046	mg/l		
MW-13 Dup	6/19/00	Silts & Clays	6010	Lead	0.099	mg/l		
MW-13 Dup	6/19/00	Silts & Clays	6010	Nickel	0.012	mg/l	B	
MW-13 Dup	6/19/00	Silts & Clays	6010	Vanadium	0.02	mg/l		
MW-13 Dup	6/19/00	Silts & Clays	6010	Zinc	0.089	mg/l		
MW-13 Dup	6/19/00	Silts & Clays	8141	Alachlor	2.4	ug/l		NJ
MW-13 Dup	6/19/00	Silts & Clays	8260	Benzene	780	ug/l		
MW-13 Dup	6/19/00	Silts & Clays	8260	Chlorobenzene	1400	ug/l	D	J
MW-13 Dup	6/19/00	Silts & Clays	8270	Acenaphthene	3.4	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Benzo(a)anthracene	0.66	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Benzo(a)pyrene	0.87	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Benzo(g,h,i)perylene	0.84	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	6	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-13 Dup	6/19/00	Silts & Clays	8270	Chrysene	0.59	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Diethylphthalate	0.6	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Fluoranthene	2.1	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Fluorene	1.7	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	0.71	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	Naphthalene	0.49	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	8270	p-chloroaniline	560	ug/l	D	
MW-13 Dup	6/19/00	Silts & Clays	8270	Pyrene	1.9	ug/l	J	
MW-13 Dup	6/19/00	Silts & Clays	SW9012	Cyanide, Total	0.01	mg/l	B	
MW-13 DupF	6/19/00	Silts & Clays	6010	Arsenic	0.0033	mg/l	B	
MW-13 DupF	6/19/00	Silts & Clays	6010	Barium	0.41	mg/l		
MW-13 DupF	6/19/00	Silts & Clays	6010	Copper	0.0018	mg/l	B	
MW-13R	07/07/2000	Bedrock	6010	Barium	0.21	mg/l		
MW-13R	07/07/2000	Bedrock	6010	Chromium	0.022	mg/l		
MW-13R	07/07/2000	Bedrock	6010	Cobalt	0.0022	mg/l	B	
MW-13R	07/07/2000	Bedrock	6010	Copper	0.0094	mg/l	B	J
MW-13R	07/07/2000	Bedrock	6010	Lead	0.0021	mg/l	B	
MW-13R	07/07/2000	Bedrock	6010	Nickel	0.054	mg/l		
MW-13R	07/07/2000	Bedrock	6010	Zinc	0.05	mg/l		
MW-13R	07/07/2000	Bedrock	8141	Alachlor	2.7	ug/l		J
MW-13R	07/07/2000	Bedrock	8260	Acetone	24	ug/l	J	
MW-13R	07/07/2000	Bedrock	8260	Chlorobenzene	1.4	ug/l	J	
MW-13R	07/07/2000	Bedrock	8260	Tetrachloroethene	12	ug/l		
MW-13R	07/07/2000	Bedrock	8260	Toluene	2.2	ug/l	J	
MW-13R	07/07/2000	Bedrock	8270	Bis(2-ethylhexyl)phthalate	55	ug/l	B	J
MW-13R	07/07/2000	Bedrock	8270	Butylbenzylphthalate	1.9	ug/l	J	
MW-13R	07/07/2000	Bedrock	8270	Di-n-butylphthalate	4.4	ug/l	J	
MW-13R	07/07/2000	Bedrock	8270	Diethylphthalate	0.58	ug/l	J	
MW-13R	07/07/2000	Bedrock	8270	Fluoranthene	0.38	ug/l	J	
MW-13R	07/07/2000	Bedrock	8270	Phenanthrene	1.3	ug/l	J	
MW-13RF	07/07/2000	Bedrock	6010	Barium	0.17	mg/l		
MW-13RF	07/07/2000	Bedrock	6010	Cobalt	0.0021	mg/l	B	
MW-13RF	07/07/2000	Bedrock	6010	Nickel	0.04	mg/l	B	
MW-13RF	07/07/2000	Bedrock	6010	Zinc	0.011	mg/l	B	
MW-14	07/06/2000	Silts & Clays	6010	Arsenic	0.026	mg/l		
MW-14	07/06/2000	Silts & Clays	6010	Barium	0.38	mg/l		J
MW-14	07/06/2000	Silts & Clays	6010	Chromium	0.011	mg/l		
MW-14	07/06/2000	Silts & Clays	6010	Cobalt	0.0042	mg/l	B	
MW-14	07/06/2000	Silts & Clays	6010	Copper	0.018	mg/l	B	
MW-14	07/06/2000	Silts & Clays	6010	Lead	0.029	mg/l		
MW-14	07/06/2000	Silts & Clays	6010	Nickel	0.012	mg/l	B	
MW-14	07/06/2000	Silts & Clays	6010	Vanadium	0.0077	mg/l	B	
MW-14	07/06/2000	Silts & Clays	6010	Zinc	0.088	mg/l		
MW-14	07/06/2000	Silts & Clays	8141	Alachlor	220000	ug/l		
MW-14	07/06/2000	Silts & Clays	8260	Chlorobenzene	91000	ug/l	D	
MW-14F	07/06/2000	Silts & Clays	6010	Arsenic	0.011	mg/l		
MW-14F	07/06/2000	Silts & Clays	6010	Barium	0.29	mg/l		
MW-14F	07/06/2000	Silts & Clays	6010	Cobalt	0.0019	mg/l	B	
MW-14F	07/06/2000	Silts & Clays	7470	Mercury	0.00019	mg/l	B	
MW-15	07/18/2000	Sand	6010	Arsenic	0.16	mg/l		
MW-15	07/18/2000	Sand	6010	Barium	0.43	mg/l		
MW-15	07/18/2000	Sand	6010	Cadmium	0.0011	mg/l	B	
MW-15	07/18/2000	Sand	6010	Chromium	0.014	mg/l		
MW-15	07/18/2000	Sand	6010	Cobalt	0.0056	mg/l	B	
MW-15	07/18/2000	Sand	6010	Copper	0.024	mg/l		
MW-15	07/18/2000	Sand	6010	Lead	0.013	mg/l		
MW-15	07/18/2000	Sand	6010	Nickel	0.017	mg/l	B	
MW-15	07/18/2000	Sand	6010	Vanadium	0.027	mg/l		

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-15	07/18/2000	Sand	6010	Zinc	0.061	mg/l	N	
MW-15	07/18/2000	Sand	8141	Alachlor	8.1	ug/l	P	
MW-15	07/18/2000	Sand	8260	Chlorobenzene	26	ug/l		
MW-15	07/18/2000	Sand	8260	cis/trans-1,2-Dichloroethene	14	ug/l		
MW-15	07/18/2000	Sand	8260	Toluene	0.83	ug/l	J	
MW-15	07/18/2000	Sand	8260	Trichloroethene	0.38	ug/l	J	
MW-15	07/18/2000	Sand	8260	Vinyl chloride	0.93	ug/l		
MW-15	07/18/2000	Sand	8270	Benzo(a)anthracene	0.89	ug/l	J	
MW-15	07/18/2000	Sand	8270	Benzo(a)pyrene	1.3	ug/l	J	
MW-15	07/18/2000	Sand	8270	Benzo(b)fluoranthene	1.4	ug/l	J	
MW-15	07/18/2000	Sand	8270	Benzo(g,h,i)perylene	1.8	ug/l	J	
MW-15	07/18/2000	Sand	8270	Benzo(k)fluoranthene	1.5	ug/l	J	
MW-15	07/18/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	2.4	ug/l	J	
MW-15	07/18/2000	Sand	8270	Butylbenzylphthalate	0.61	ug/l	J	
MW-15	07/18/2000	Sand	8270	Chrysene	1	ug/l	J	
MW-15	07/18/2000	Sand	8270	Di-n-octylphthalate	1.5	ug/l	J	
MW-15	07/18/2000	Sand	8270	Dibenzo(a,h)anthracene	1.4	ug/l	J	
MW-15	07/18/2000	Sand	8270	Diethylphthalate	0.86	ug/l	J	
MW-15	07/18/2000	Sand	8270	Indeno-(1,2,3-cd)pyrene	1.3	ug/l	J	
MW-15F	07/18/2000	Sand	6010	Arsenic	0.072	mg/l		
MW-15F	07/18/2000	Sand	6010	Barium	0.12	mg/l		
MW-17	07/21/2000	Silts & Clays	8260	Chlorobenzene	100	ug/l	B	J
MW-17	07/21/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	200	ug/l		
MW-17	07/21/2000	Silts & Clays	8260	Tetrachloroethene	3.4	ug/l	J	J
MW-17	07/21/2000	Silts & Clays	8260	Toluene	1.1	ug/l	J	
MW-17	07/21/2000	Silts & Clays	8260	Trichloroethene	13	ug/l		
MW-17	07/21/2000	Silts & Clays	8260	Vinyl chloride	38	ug/l		
MW-17	07/21/2000	Silts & Clays	8270	Di-n-butylphthalate	0.36	ug/l	J	
MW-18A	07/19/2000	Sand	8260	Benzene	130	ug/l		
MW-18A	07/19/2000	Sand	8260	Chlorobenzene	2700	ug/l	B	J
MW-18A	07/19/2000	Sand	8270	1,2-Dichlorobenzene	18	ug/l		
MW-18A	07/19/2000	Sand	8270	1,4-Dichlorobenzene	53	ug/l		
MW-18A	07/19/2000	Sand	8270	2,4-Dichlorophenol	1.7	ug/l	J	
MW-18A	07/19/2000	Sand	8270	2-Chlorophenol	13	ug/l		
MW-18A	07/19/2000	Sand	8270	2-Methyl naphthalene	10	ug/l		
MW-18A	07/19/2000	Sand	8270	Benzo(a)pyrene	0.91	ug/l	J	
MW-18A	07/19/2000	Sand	8270	Benzo(b)fluoranthene	0.92	ug/l	J	
MW-18A	07/19/2000	Sand	8270	Benzo(g,h,i)perylene	1.9	ug/l	J	
MW-18A	07/19/2000	Sand	8270	Benzo(k)fluoranthene	1.1	ug/l	J	
MW-18A	07/19/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	17	ug/l	B	J
MW-18A	07/19/2000	Sand	8270	Di-n-butylphthalate	1.5	ug/l	J	
MW-18A	07/19/2000	Sand	8270	Di-n-octylphthalate	1.4	ug/l	J	
MW-18A	07/19/2000	Sand	8270	Dibenzo(a,h)anthracene	1.8	ug/l	J	
MW-18A	07/19/2000	Sand	8270	Indeno-(1,2,3-cd)pyrene	0.61	ug/l	J	
MW-18A	07/19/2000	Sand	8270	Naphthalene	100	ug/l		
MW-18A	07/19/2000	Sand	8270	p-chloroaniline	2000	ug/l	D	
MW-18A	07/19/2000	Sand	8270	Phenanthrene	0.57	ug/l	J	
MW-18B	07/20/2000	Silts & Clays	8260	Chloromethane	3.4	ug/l	J	
MW-18B	07/20/2000	Silts & Clays	8270	Benzo(a)pyrene	0.47	ug/l	J	
MW-18B	07/20/2000	Silts & Clays	8270	Di-n-butylphthalate	0.27	ug/l	J	
MW-18B	07/20/2000	Silts & Clays	8270	p-chloroaniline	9.2	ug/l	J	
MW-18B	07/20/2000	Silts & Clays	8270	Phenanthrene	0.47	ug/l	J	
MW-19	06/30/2000	Silts & Clays	8260	Chlorobenzene	20000	ug/l		
MW-20	07/21/2000	Silts & Clays	6010	Arsenic	0.0047	mg/l	B	
MW-20	07/21/2000	Silts & Clays	6010	Barium	0.45	mg/l		
MW-20	07/21/2000	Silts & Clays	6010	Chromium	0.003	mg/l	B	
MW-20	07/21/2000	Silts & Clays	6010	Cobalt	0.0021	mg/l	B	
MW-20	07/21/2000	Silts & Clays	6010	Copper	0.007	mg/l	B	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-20	07/21/2000	Silts & Clays	6010	Lead	0.033	mg/l		
MW-20	07/21/2000	Silts & Clays	6010	Vanadium	0.006	mg/l	B	
MW-20	07/21/2000	Silts & Clays	6010	Zinc	0.031	mg/l		
MW-20	07/21/2000	Silts & Clays	SW7470	Mercury	0.00013	mg/l	BN	
MW-20	07/21/2000	Silts & Clays	SW9012	Cyanide, Total	1.4	mg/l		
MW-20F	07/21/2000	Silts & Clays	6010	Barium	0.39	mg/l		
MW-21R	07/11/2000	Bedrock	8141	Alachlor	1.8	ug/l		
MW-21R	07/11/2000	Bedrock	8260	Benzene	0.6	ug/l	J	
MW-21R	07/11/2000	Bedrock	8260	Chlorobenzene	140	ug/l		
MW-21R	07/11/2000	Bedrock	8260	Tetrachloroethene	5.2	ug/l		
MW-21R	07/11/2000	Bedrock	8260	Toluene	0.57	ug/l	J	
MW-22	07/17/2000	Silts & Clays	6010	Antimony	0.005	mg/l	B	
MW-22	07/17/2000	Silts & Clays	6010	Arsenic	0.0063	mg/l	B	
MW-22	07/17/2000	Silts & Clays	6010	Barium	0.17	mg/l		
MW-22	07/17/2000	Silts & Clays	6010	Chromium	0.0083	mg/l	B	
MW-22	07/17/2000	Silts & Clays	6010	Cobalt	0.0037	mg/l	B	
MW-22	07/17/2000	Silts & Clays	6010	Copper	0.012	mg/l	B	
MW-22	07/17/2000	Silts & Clays	6010	Lead	0.0087	mg/l		
MW-22	07/17/2000	Silts & Clays	6010	Nickel	0.012	mg/l	B	
MW-22	07/17/2000	Silts & Clays	6010	Vanadium	0.02	mg/l		
MW-22	07/17/2000	Silts & Clays	6010	Zinc	0.04	mg/l	N	J
MW-22	07/17/2000	Silts & Clays	8141	Alachlor	7	ug/l		
MW-22	07/17/2000	Silts & Clays	8260	1,2-Dichloroethane	17	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8260	Chlorobenzene	14	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	82	ug/l		
MW-22	07/17/2000	Silts & Clays	8260	Tetrachloroethene	380	ug/l		J
MW-22	07/17/2000	Silts & Clays	8260	Trichloroethene	100	ug/l		
MW-22	07/17/2000	Silts & Clays	8260	Vinyl chloride	3.3	ug/l		
MW-22	07/17/2000	Silts & Clays	8270	Benzo(a)anthracene	2.3	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Benzo(a)pyrene	1.2	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Benzo(b)fluoranthene	1.5	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Benzo(g,h,i)perylene	1.2	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Benzo(k)fluoranthene	1.3	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	4.3	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Butylbenzylphthalate	2.6	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Chrysene	2.7	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Di-n-octylphthalate	1.1	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Dibenzo(a,h)anthracene	0.88	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Fluoranthene	0.73	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	0.92	ug/l	J	
MW-22	07/17/2000	Silts & Clays	8270	Pyrene	1.2	ug/l	J	
MW-22F	07/17/2000	Silts & Clays	6010	Arsenic	0.0034	mg/l	B	
MW-22F	07/17/2000	Silts & Clays	6010	Barium	0.098	mg/l		
MW-22F	07/17/2000	Silts & Clays	6010	Vanadium	0.0028	mg/l	B	
MW-23	07/21/2000	Silts & Clays	6010	Arsenic	0.009	mg/l	B	
MW-23	07/21/2000	Silts & Clays	6010	Barium	0.54	mg/l		
MW-23	07/21/2000	Silts & Clays	6010	Beryllium	0.0006	mg/l	B	
MW-23	07/21/2000	Silts & Clays	6010	Cadmium	0.00083	mg/l	B	
MW-23	07/21/2000	Silts & Clays	6010	Chromium	0.018	mg/l		
MW-23	07/21/2000	Silts & Clays	6010	Cobalt	0.0073	mg/l	B	
MW-23	07/21/2000	Silts & Clays	6010	Copper	0.024	mg/l		
MW-23	07/21/2000	Silts & Clays	6010	Lead	0.11	mg/l		
MW-23	07/21/2000	Silts & Clays	6010	Nickel	0.019	mg/l	B	
MW-23	07/21/2000	Silts & Clays	6010	Vanadium	0.034	mg/l		
MW-23	07/21/2000	Silts & Clays	6010	Zinc	0.099	mg/l		
MW-23	07/21/2000	Silts & Clays	8260	Carbon disulfide	8	ug/l		
MW-23	07/21/2000	Silts & Clays	8260	Chlorobenzene	52	ug/l		
MW-23	07/21/2000	Silts & Clays	8270	Acenaphthene	1.6	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-23	07/21/2000	Silts & Clays	8270	Anthracene	0.34	ug/l	J	
MW-23	07/21/2000	Silts & Clays	8270	Di-n-butylphthalate	0.27	ug/l	J	
MW-23	07/21/2000	Silts & Clays	8270	Fluorene	1.3	ug/l	J	
MW-23	07/21/2000	Silts & Clays	8270	Naphthalene	0.62	ug/l	J	
MW-23	07/21/2000	Silts & Clays	8270	p-chloroaniline	26	ug/l		
MW-23	07/21/2000	Silts & Clays	8270	Phenanthrene	0.34	ug/l	J	
MW-23	07/21/2000	Silts & Clays	SW7470	Mercury	0.00012	mg/l	BN	
MW-23	07/21/2000	Silts & Clays	SW9012	Cyanide, Total	0.039	mg/l		
MW-23F	07/21/2000	Silts & Clays	6010	Arsenic	0.0037	mg/l	B	
MW-23F	07/21/2000	Silts & Clays	6010	Barium	0.31	mg/l		
MW-24A	07/24/2000	Silts & Clays	6010	Arsenic	0.35	mg/l		
MW-24A	07/24/2000	Silts & Clays	6010	Barium	0.42	mg/l		
MW-24A	07/24/2000	Silts & Clays	6010	Cobalt	0.002	mg/l	B	
MW-24A	07/24/2000	Silts & Clays	6010	Lead	0.0023	mg/l	B	
MW-24A	07/24/2000	Silts & Clays	6010	Nickel	0.044	mg/l		
MW-24A	07/24/2000	Silts & Clays	6010	Zinc	0.056	mg/l		
MW-24A	07/24/2000	Silts & Clays	8260	Benzene	83	ug/l		
MW-24A	07/24/2000	Silts & Clays	8260	Chlorobenzene	21	ug/l		
MW-24A	07/24/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	46	ug/l		
MW-24A	07/24/2000	Silts & Clays	8260	Toluene	0.85	ug/l	J	
MW-24A	07/24/2000	Silts & Clays	8260	Trichloroethene	2.5	ug/l	J	
MW-24A	07/24/2000	Silts & Clays	8260	Xylene	14	ug/l		
MW-24A	07/24/2000	Silts & Clays	8270	2,4-Dimethylphenol	6.2	ug/l	J	
MW-24A	07/24/2000	Silts & Clays	8270	2-Chlorophenol	36	ug/l		
MW-24A	07/24/2000	Silts & Clays	8270	Benzo(g,h,i)perylene	1.2	ug/l	J	
MW-24A	07/24/2000	Silts & Clays	8270	Di-n-butylphthalate	0.34	ug/l	J	
MW-24A	07/24/2000	Silts & Clays	8270	Di-n-octylphthalate	0.48	ug/l	J	
MW-24A	07/24/2000	Silts & Clays	8270	Naphthalene	12	ug/l		
MW-24A	07/24/2000	Silts & Clays	8270	p-chloroaniline	97	ug/l		
MW-24A	07/24/2000	Silts & Clays	8270	Phenol	140	ug/l		
MW-24AF	07/24/2000	Silts & Clays	6010	Arsenic	0.026	mg/l		
MW-24AF	07/24/2000	Silts & Clays	6010	Barium	0.61	mg/l		
MW-24AF	07/24/2000	Silts & Clays	6010	Cadmium	0.00095	mg/l	B	
MW-24AF	07/24/2000	Silts & Clays	6010	Chromium	0.014	mg/l		
MW-24AF	07/24/2000	Silts & Clays	6010	Cobalt	0.0066	mg/l	B	
MW-24AF	07/24/2000	Silts & Clays	6010	Copper	0.017	mg/l	B	
MW-24AF	07/24/2000	Silts & Clays	6010	Lead	0.017	mg/l		
MW-24AF	07/24/2000	Silts & Clays	6010	Nickel	0.018	mg/l	B	
MW-24AF	07/24/2000	Silts & Clays	6010	Vanadium	0.027	mg/l		
MW-24AF	07/24/2000	Silts & Clays	6010	Zinc	0.02	mg/l		
MW-24B	07/11/2000	Sand	6010	Arsenic	0.019	mg/l		
MW-24B	07/11/2000	Sand	6010	Barium	0.11	mg/l		
MW-24B	07/11/2000	Sand	6010	Chromium	0.0025	mg/l	B	
MW-24B	07/11/2000	Sand	6010	Copper	0.0093	mg/l	B	
MW-24B	07/11/2000	Sand	6010	Lead	0.027	mg/l		
MW-24B	07/11/2000	Sand	6010	Nickel	0.0096	mg/l	B	
MW-24B	07/11/2000	Sand	6010	Vanadium	0.021	mg/l		
MW-24B	07/11/2000	Sand	6010	Zinc	0.036	mg/l	N	
MW-24B	07/11/2000	Sand	8260	Benzene	6200	ug/l		
MW-24B	07/11/2000	Sand	8260	Chlorobenzene	15000	ug/l		
MW-24B	07/11/2000	Sand	8260	Methylene chloride	180	ug/l	JB	J
MW-24B	07/11/2000	Sand	8260	Toluene	110	ug/l	J	
MW-24B	07/11/2000	Sand	8270	2-Chlorophenol	24	ug/l		
MW-24B	07/11/2000	Sand	8270	2-Methyl naphthalene	44	ug/l		
MW-24B	07/11/2000	Sand	8270	Acenaphthene	1.4	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Anthracene	0.4	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Benzo(a)anthracene	0.65	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Benzo(a)pyrene	0.92	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-24B	07/11/2000	Sand	8270	Benzo(b)fluoranthene	0.71	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Benzo(g,h,i)perylene	1.4	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Benzo(k)fluoranthene	0.86	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	7.9	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Butylbenzylphthalate	0.76	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Chrysene	0.8	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Di-n-butylphthalate	0.74	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Di-n-octylphthalate	2.3	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Dibenzo(a,h)anthracene	1.1	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Dibenzofuran	0.58	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Fluoranthene	0.66	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Fluorene	1.6	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Indeno-(1,2,3-cd)pyrene	1.3	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Naphthalene	64	ug/l		
MW-24B	07/11/2000	Sand	8270	p-chloroaniline	94	ug/l		
MW-24B	07/11/2000	Sand	8270	Phenanthrene	1.6	ug/l	J	
MW-24B	07/11/2000	Sand	8270	Phenol	49	ug/l		
MW-24B	07/11/2000	Sand	8270	Pyrene	0.63	ug/l	J	
MW-24BF	07/11/2000	Sand	6010	Arsenic	0.017	mg/l		
MW-24BF	07/11/2000	Sand	6010	Barium	0.028	mg/l		
MW-24BF	07/11/2000	Sand	6010	Lead	0.0066	mg/l		
MW-24BF	07/11/2000	Sand	6010	Nickel	0.0064	mg/l	B	
MW-24BF	07/11/2000	Sand	6010	Vanadium	0.018	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Arsenic	0.31	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Barium	5.3	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Beryllium	0.017	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Cadmium	0.008	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Chromium	0.46	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Cobalt	0.16	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Copper	0.58	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Lead	0.6	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Nickel	0.47	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Selenium	0.013	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Thallium	0.0099	mg/l	B	
MW-25A	07/11/2000	Silts & Clays	6010	Tin	0.023	mg/l	B	
MW-25A	07/11/2000	Silts & Clays	6010	Vanadium	0.83	mg/l		
MW-25A	07/11/2000	Silts & Clays	6010	Zinc	1.5	mg/l	N	
MW-25A	07/11/2000	Silts & Clays	8260	Benzene	160	ug/l		
MW-25A	07/11/2000	Silts & Clays	8260	Chlorobenzene	950	ug/l		
MW-25A	07/11/2000	Silts & Clays	8260	Ethylbenzene	160	ug/l		
MW-25A	07/11/2000	Silts & Clays	8260	Toluene	16	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8260	Xylene	370	ug/l		
MW-25A	07/11/2000	Silts & Clays	8270	2-Chlorophenol	2.5	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	2-Methyl naphthalene	53	ug/l		
MW-25A	07/11/2000	Silts & Clays	8270	Acenaphthene	0.75	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Anthracene	0.37	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Benzo(a)anthracene	0.82	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Benzo(a)pyrene	0.71	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Benzo(b)fluoranthene	0.61	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Benzo(g,h,i)perylene	0.7	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	8.7	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Butylbenzylphthalate	0.6	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Chrysene	0.92	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Di-n-butylphthalate	0.75	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Di-n-octylphthalate	0.84	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Dibenzofuran	0.37	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Fluoranthene	0.94	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Fluorene	0.7	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-25A	07/11/2000	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	0.61	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Naphthalene	35	ug/l		
MW-25A	07/11/2000	Silts & Clays	8270	Phenanthrene	1.8	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	8270	Pyrene	0.9	ug/l	J	
MW-25A	07/11/2000	Silts & Clays	SW7470	Mercury	0.00098	mg/l		
MW-25AF	07/11/2000	Silts & Clays	6010	Arsenic	0.14	mg/l		
MW-25AF	07/11/2000	Silts & Clays	6010	Barium	0.42	mg/l		
MW-25B	07/10/2000	Sand	6010	Arsenic	0.0098	mg/l	B	
MW-25B	07/10/2000	Sand	6010	Barium	0.2	mg/l		J
MW-25B	07/10/2000	Sand	6010	Chromium	0.0023	mg/l	B	
MW-25B	07/10/2000	Sand	6010	Copper	0.0096	mg/l	B	
MW-25B	07/10/2000	Sand	6010	Lead	0.027	mg/l		
MW-25B	07/10/2000	Sand	6010	Nickel	0.0048	mg/l	B	
MW-25B	07/10/2000	Sand	6010	Vanadium	0.009	mg/l	B	
MW-25B	07/10/2000	Sand	6010	Zinc	0.031	mg/l		
MW-25B	07/10/2000	Sand	8260	2-Butanone (MEK)	26	ug/l		
MW-25B	07/10/2000	Sand	8260	Acetone	32	ug/l	J	
MW-25B	07/10/2000	Sand	8260	Benzene	3.4	ug/l	J	
MW-25B	07/10/2000	Sand	8260	Chlorobenzene	63	ug/l		
MW-25B	07/10/2000	Sand	8260	Chloroform	2.8	ug/l	J	
MW-25B	07/10/2000	Sand	8260	cis/trans-1,2-Dichloroethene	5.6	ug/l		
MW-25B	07/10/2000	Sand	8260	Ethylbenzene	1.4	ug/l	J	
MW-25B	07/10/2000	Sand	8260	Methylene chloride	0.74	ug/l	J	
MW-25B	07/10/2000	Sand	8260	Toluene	0.93	ug/l	J	
MW-25B	07/10/2000	Sand	8260	Vinyl chloride	14	ug/l		
MW-25B	07/10/2000	Sand	8260	Xylene	41	ug/l		
MW-25B	07/10/2000	Sand	8270	2-Chlorophenol	3.9	ug/l	J	
MW-25B	07/10/2000	Sand	8270	Di-n-butylphthalate	0.43	ug/l	J	
MW-25B	07/10/2000	Sand	8270	Di-n-octylphthalate	0.56	ug/l	J	
MW-25BF	07/10/2000	Sand	6010	Antimony	0.0052	mg/l	B	
MW-25BF	07/10/2000	Sand	6010	Arsenic	0.0071	mg/l	B	
MW-25BF	07/10/2000	Sand	6010	Barium	0.16	mg/l		
MW-25BF	07/10/2000	Sand	6010	Copper	0.0033	mg/l	B	
MW-25BF	07/10/2000	Sand	6010	Lead	0.0022	mg/l	B	
MW-25BF	07/10/2000	Sand	6010	Vanadium	0.0055	mg/l	B	
MW-25BF	07/10/2000	Sand	6010	Zinc	0.0091	mg/l	B	
MW-26	07/18/2000	Silts & Clays	6010	Arsenic	0.018	mg/l		
MW-26	07/18/2000	Silts & Clays	6010	Barium	0.96	mg/l		
MW-26	07/18/2000	Silts & Clays	6010	Beryllium	0.0028	mg/l	B	
MW-26	07/18/2000	Silts & Clays	6010	Cadmium	0.0016	mg/l	B	
MW-26	07/18/2000	Silts & Clays	6010	Chromium	0.043	mg/l		
MW-26	07/18/2000	Silts & Clays	6010	Cobalt	0.011	mg/l		
MW-26	07/18/2000	Silts & Clays	6010	Copper	0.041	mg/l		
MW-26	07/18/2000	Silts & Clays	6010	Lead	0.04	mg/l		
MW-26	07/18/2000	Silts & Clays	6010	Nickel	0.028	mg/l	B	
MW-26	07/18/2000	Silts & Clays	6010	Selenium	0.0048	mg/l	B	
MW-26	07/18/2000	Silts & Clays	6010	Vanadium	0.066	mg/l		
MW-26	07/18/2000	Silts & Clays	6010	Zinc	0.13	mg/l	N	
MW-26	07/18/2000	Silts & Clays	8141	Alachlor	1.2	ug/l		
MW-26	07/18/2000	Silts & Clays	8260	Toluene	0.77	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Benzo(a)anthracene	1.1	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Benzo(a)pyrene	1.4	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Benzo(b)fluoranthene	1.6	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Benzo(g,h,i)perylene	2.4	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Benzo(k)fluoranthene	1.6	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	5	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Butylbenzylphthalate	0.96	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Chrysene	1.4	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-26	07/18/2000	Silts & Clays	8270	Di-n-octylphthalate	1.6	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Dibenzo(a,h)anthracene	2.3	ug/l	J	
MW-26	07/18/2000	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	2.1	ug/l	J	
MW-26	07/18/2000	Silts & Clays	SW7470	Mercury	0.00011	mg/l	B	
MW-26F	07/18/2000	Silts & Clays	6010	Barium	0.15	mg/l		
MW-26F	07/18/2000	Silts & Clays	6010	Copper	0.0048	mg/l	B	J
MW-26F	07/18/2000	Silts & Clays	6010	Vanadium	0.0035	mg/l	B	
MW-27	07/21/2000	Silts & Clays	6010	Arsenic	0.0036	mg/l	B	
MW-27	07/21/2000	Silts & Clays	6010	Barium	0.39	mg/l		
MW-27	07/21/2000	Silts & Clays	6010	Copper	0.0029	mg/l	B	
MW-27	07/21/2000	Silts & Clays	6010	Lead	0.0033	mg/l	B	
MW-27	07/21/2000	Silts & Clays	6010	Vanadium	0.0034	mg/l	B	
MW-27	07/21/2000	Silts & Clays	6010	Zinc	0.035	mg/l		
MW-27	07/21/2000	Silts & Clays	SW9012	Cyanide, Total	0.11	mg/l		
MW-27F	07/21/2000	Silts & Clays	6010	Barium	0.33	mg/l		
MW-28A	07/21/2000	Silts & Clays	6010	Arsenic	0.0046	mg/l	B	
MW-28A	07/21/2000	Silts & Clays	6010	Barium	0.47	mg/l		
MW-28A	07/21/2000	Silts & Clays	6010	Cadmium	0.00091	mg/l	B	
MW-28A	07/21/2000	Silts & Clays	6010	Chromium	0.011	mg/l		
MW-28A	07/21/2000	Silts & Clays	6010	Copper	0.0021	mg/l	B	
MW-28A	07/21/2000	Silts & Clays	6010	Lead	0.0033	mg/l	B	
MW-28A	07/21/2000	Silts & Clays	6010	Zinc	0.031	mg/l		
MW-28A	07/21/2000	Silts & Clays	8260	Carbon disulfide	7.4	ug/l		
MW-28A	07/21/2000	Silts & Clays	8270	2-Methyl naphthalene	2	ug/l	J	
MW-28A	07/21/2000	Silts & Clays	8270	Acenaphthene	9.1	ug/l	J	
MW-28A	07/21/2000	Silts & Clays	8270	Dibenzofuran	5.3	ug/l	J	
MW-28A	07/21/2000	Silts & Clays	8270	Fluoranthene	0.45	ug/l	J	
MW-28A	07/21/2000	Silts & Clays	8270	Fluorene	10	ug/l		
MW-28A	07/21/2000	Silts & Clays	8270	Phenanthrene	11	ug/l		
MW-28AF	07/21/2000	Silts & Clays	6010	Arsenic	0.0034	mg/l	B	
MW-28AF	07/21/2000	Silts & Clays	6010	Barium	0.4	mg/l		
MW-28AF	07/21/2000	Silts & Clays	6010	Chromium	0.0056	mg/l	B	
MW-28B	07/20/2000	Sand	6010	Arsenic	0.11	mg/l		
MW-28B	07/20/2000	Sand	6010	Barium	2.2	mg/l		
MW-28B	07/20/2000	Sand	6010	Beryllium	0.006	mg/l		
MW-28B	07/20/2000	Sand	6010	Cadmium	0.01	mg/l		
MW-28B	07/20/2000	Sand	6010	Chromium	0.57	mg/l		
MW-28B	07/20/2000	Sand	6010	Cobalt	0.062	mg/l		
MW-28B	07/20/2000	Sand	6010	Copper	0.24	mg/l		
MW-28B	07/20/2000	Sand	6010	Lead	0.91	mg/l		
MW-28B	07/20/2000	Sand	6010	Nickel	0.17	mg/l		
MW-28B	07/20/2000	Sand	6010	Selenium	0.0063	mg/l	B	
MW-28B	07/20/2000	Sand	6010	Tin	0.03	mg/l	B	
MW-28B	07/20/2000	Sand	6010	Vanadium	0.3	mg/l		
MW-28B	07/20/2000	Sand	6010	Zinc	0.99	mg/l		
MW-28B	07/20/2000	Sand	8260	Acetone	12	ug/l	J	
MW-28B	07/20/2000	Sand	8260	Benzene	1.5	ug/l	J	
MW-28B	07/20/2000	Sand	8260	Carbon disulfide	5.1	ug/l		
MW-28B	07/20/2000	Sand	8260	Chlorobenzene	120	ug/l		
MW-28B	07/20/2000	Sand	8260	Chloromethane	2.8	ug/l	J	
MW-28B	07/20/2000	Sand	8270	1,4-Dichlorobenzene	0.62	ug/l	J	
MW-28B	07/20/2000	Sand	8270	2-Chlorophenol	1.2	ug/l	J	
MW-28B	07/20/2000	Sand	8270	2-Methyl naphthalene	35	ug/l		
MW-28B	07/20/2000	Sand	8270	Acenaphthene	16	ug/l		
MW-28B	07/20/2000	Sand	8270	Anthracene	2.8	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Benzo(a)anthracene	1.3	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Benzo(a)pyrene	1.1	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Benzo(b)fluoranthene	1	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-28B	07/20/2000	Sand	8270	Benzo(g,h,i)perylene	0.84	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Benzo(k)fluoranthene	1.3	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Chrysene	1.3	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Di-n-butylphthalate	0.37	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Di-n-octylphthalate	0.66	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Dibenzofuran	7.8	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Fluoranthene	4.7	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Fluorene	12	ug/l		
MW-28B	07/20/2000	Sand	8270	Indeno-(1,2,3-cd)pyrene	0.8	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Naphthalene	8.4	ug/l	J	
MW-28B	07/20/2000	Sand	8270	p-chloroaniline	3.3	ug/l	J	
MW-28B	07/20/2000	Sand	8270	Phenanthrene	21	ug/l		
MW-28B	07/20/2000	Sand	8270	Pyrene	3.5	ug/l	J	
MW-28B	07/20/2000	Sand	SW7470	Mercury	0.0029	mg/l	SN	
MW-28BF	07/20/2000	Sand	6010	Arsenic	0.041	mg/l		
MW-28BF	07/20/2000	Sand	6010	Barium	0.58	mg/l		
MW-28BF	07/20/2000	Sand	6010	Cobalt	0.0015	mg/l	B	
MW-29	07/12/2000	Sand	6010	Barium	0.089	mg/l		
MW-29	07/12/2000	Sand	6010	Chromium	0.0027	mg/l	B	
MW-29	07/12/2000	Sand	6010	Copper	0.019	mg/l	B	
MW-29	07/12/2000	Sand	6010	Lead	0.011	mg/l		
MW-29	07/12/2000	Sand	6010	Vanadium	0.0041	mg/l	B	
MW-29	07/12/2000	Sand	6010	Zinc	0.033	mg/l	N	
MW-29	07/12/2000	Sand	8260	Benzene	2	ug/l	J	
MW-29	07/12/2000	Sand	8260	Bromodichloromethane	1.9	ug/l	J	
MW-29	07/12/2000	Sand	8260	Chlorobenzene	140	ug/l		
MW-29	07/12/2000	Sand	8260	Chloroform	6.8	ug/l		
MW-29	07/12/2000	Sand	8260	cis/trans-1,2-Dichloroethene	7.9	ug/l		
MW-29	07/12/2000	Sand	8260	Trichloroethene	0.44	ug/l	J	
MW-29	07/12/2000	Sand	8260	Vinyl chloride	6.8	ug/l		
MW-29	07/12/2000	Sand	8270	1,4-Dichlorobenzene	0.44	ug/l	J	
MW-29	07/12/2000	Sand	8270	2-Chlorophenol	0.87	ug/l	J	
MW-29	07/12/2000	Sand	8270	Benzo(a)anthracene	0.38	ug/l	J	
MW-29	07/12/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	13	ug/l		
MW-29	07/12/2000	Sand	8270	Butylbenzylphthalate	2.5	ug/l	J	
MW-29	07/12/2000	Sand	8270	Di-n-butylphthalate	0.72	ug/l	J	
MW-29	07/12/2000	Sand	8270	Di-n-octylphthalate	0.39	ug/l	J	
MW-29F	07/12/2000	Sand	6010	Barium	0.064	mg/l		
MW-29F	07/12/2000	Sand	6010	Copper	0.0049	mg/l	B	J
MW-29F	07/12/2000	Sand	6010	Vanadium	0.0025	mg/l	B	
MW-29 DUP	07/12/2000	Sand	6010	Barium	0.1	mg/l		
MW-29 DUP	07/12/2000	Sand	6010	Chromium	0.0028	mg/l	B	
MW-29 DUP	07/12/2000	Sand	6010	Copper	0.016	mg/l	B	
MW-29 DUP	07/12/2000	Sand	6010	Lead	0.011	mg/l		
MW-29 DUP	07/12/2000	Sand	6010	Vanadium	0.004	mg/l	B	
MW-29 DUP	07/12/2000	Sand	6010	Zinc	0.061	mg/l	N	
MW-29 DUP	07/12/2000	Sand	8260	Benzene	2.2	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8260	Bromodichloromethane	1.9	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8260	Chlorobenzene	160	ug/l		
MW-29 DUP	07/12/2000	Sand	8260	Chloroform	6.9	ug/l		
MW-29 DUP	07/12/2000	Sand	8260	cis/trans-1,2-Dichloroethene	8.5	ug/l		
MW-29 DUP	07/12/2000	Sand	8260	Trichloroethene	0.5	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8260	Vinyl chloride	7.3	ug/l		
MW-29 DUP	07/12/2000	Sand	8270	1,2-Dichlorobenzene	0.37	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8270	1,4-Dichlorobenzene	0.47	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8270	2-Chlorophenol	1.4	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8270	Benzo(a)anthracene	0.43	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8270	Benzo(b)fluoranthene	0.33	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-29 DUP	07/12/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	15	ug/l		
MW-29 DUP	07/12/2000	Sand	8270	Butylbenzylphthalate	3.1	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8270	Di-n-butylphthalate	0.74	ug/l	J	
MW-29 DUP	07/12/2000	Sand	8270	Di-n-octylphthalate	0.86	ug/l	J	
MW-29 DUPF	07/12/2000	Sand	6010	Barium	0.065	mg/l		
MW-29 DUPF	07/12/2000	Sand	6010	Copper	0.0047	mg/l	B	J
MW-29 DUPF	07/12/2000	Sand	6010	Vanadium	0.0027	mg/l	B	
MW-30A	07/12/2000	Silts & Clays	6010	Arsenic	0.022	mg/l		
MW-30A	07/12/2000	Silts & Clays	6010	Barium	0.99	mg/l		
MW-30A	07/12/2000	Silts & Clays	6010	Beryllium	0.0017	mg/l	B	
MW-30A	07/12/2000	Silts & Clays	6010	Cadmium	0.003	mg/l	B	
MW-30A	07/12/2000	Silts & Clays	6010	Chromium	0.043	mg/l		
MW-30A	07/12/2000	Silts & Clays	6010	Cobalt	0.015	mg/l		
MW-30A	07/12/2000	Silts & Clays	6010	Copper	0.1	mg/l		
MW-30A	07/12/2000	Silts & Clays	6010	Lead	0.36	mg/l		
MW-30A	07/12/2000	Silts & Clays	6010	Nickel	0.044	mg/l		
MW-30A	07/12/2000	Silts & Clays	6010	Tin	0.012	mg/l	B	
MW-30A	07/12/2000	Silts & Clays	6010	Vanadium	0.08	mg/l		
MW-30A	07/12/2000	Silts & Clays	6010	Zinc	0.28	mg/l	N	
MW-30A	07/12/2000	Silts & Clays	8260	Carbon disulfide	9.3	ug/l		
MW-30A	07/12/2000	Silts & Clays	8270	Benzo(a)anthracene	0.49	ug/l	J	
MW-30A	07/12/2000	Silts & Clays	8270	Benzo(a)pyrene	0.48	ug/l	J	
MW-30A	07/12/2000	Silts & Clays	8270	Benzo(b)fluoranthene	0.31	ug/l	J	
MW-30A	07/12/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	3.8	ug/l	J	
MW-30A	07/12/2000	Silts & Clays	8270	Di-n-butylphthalate	0.91	ug/l	J	
MW-30A	07/12/2000	Silts & Clays	8270	Di-n-octylphthalate	0.48	ug/l	J	
MW-30A	07/12/2000	Silts & Clays	SW7470	Mercury	0.0013	mg/l		
MW-30AF	07/12/2000	Silts & Clays	6010	Barium	0.36	mg/l		
MW-30B	07/12/2000	Sand	6010	Arsenic	0.099	mg/l		
MW-30B	07/12/2000	Sand	6010	Barium	3.1	mg/l		
MW-30B	07/12/2000	Sand	6010	Beryllium	0.0087	mg/l		
MW-30B	07/12/2000	Sand	6010	Cadmium	0.012	mg/l		
MW-30B	07/12/2000	Sand	6010	Chromium	0.27	mg/l		
MW-30B	07/12/2000	Sand	6010	Cobalt	0.087	mg/l		
MW-30B	07/12/2000	Sand	6010	Copper	0.3	mg/l		
MW-30B	07/12/2000	Sand	6010	Lead	0.67	mg/l		
MW-30B	07/12/2000	Sand	6010	Nickel	0.25	mg/l		
MW-30B	07/12/2000	Sand	6010	Selenium	0.0084	mg/l	B	
MW-30B	07/12/2000	Sand	6010	Tin	0.036	mg/l	B	
MW-30B	07/12/2000	Sand	6010	Vanadium	0.46	mg/l		
MW-30B	07/12/2000	Sand	6010	Zinc	1	mg/l	N	
MW-30B	07/12/2000	Sand	8260	Benzene	7	ug/l		
MW-30B	07/12/2000	Sand	8260	Chlorobenzene	210	ug/l		
MW-30B	07/12/2000	Sand	8260	cis/trans-1,2-Dichloroethene	1.8	ug/l		
MW-30B	07/12/2000	Sand	8260	Toluene	0.62	ug/l	J	
MW-30B	07/12/2000	Sand	8260	Vinyl chloride	36	ug/l		
MW-30B	07/12/2000	Sand	8270	1,2-Dichlorobenzene	0.73	ug/l	J	
MW-30B	07/12/2000	Sand	8270	1,4-Dichlorobenzene	1.4	ug/l	J	
MW-30B	07/12/2000	Sand	8270	2-Chlorophenol	3.2	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Acenaphthene	0.46	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Anthracene	0.72	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Benzo(a)anthracene	1.1	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Benzo(a)pyrene	0.83	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Benzo(b)fluoranthene	0.61	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Benzo(k)fluoranthene	0.92	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	3.5	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Butylbenzylphthalate	0.53	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Chrysene	0.93	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
MW-30B	07/12/2000	Sand	8270	Di-n-butylphthalate	0.55	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Di-n-octylphthalate	0.47	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Fluoranthene	1.4	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Fluorene	0.44	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Indeno-(1,2,3-cd)pyrene	0.62	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Naphthalene	1.6	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Phenanthrene	2.2	ug/l	J	
MW-30B	07/12/2000	Sand	8270	Pyrene	1.3	ug/l	J	
MW-30B	07/12/2000	Sand	SW7470	Mercury	0.0076	mg/l		
MW-30BF	07/12/2000	Sand	6010	Arsenic	0.0079	mg/l	B	
MW-30BF	07/12/2000	Sand	6010	Barium	0.77	mg/l		
OBS-1	07/20/2000	Sand	6010	Barium	0.3	mg/l		
OBS-1	07/20/2000	Sand	6010	Copper	0.0049	mg/l	B	
OBS-1	07/20/2000	Sand	6010	Nickel	0.014	mg/l	B	
OBS-1	07/20/2000	Sand	8260	Acetone	52	ug/l		
OBS-1	07/20/2000	Sand	8260	Benzene	4.8	ug/l	J	
OBS-1	07/20/2000	Sand	8260	Chlorobenzene	500	ug/l	D	
OBS-1	07/20/2000	Sand	8260	Tetrachloroethene	5.2	ug/l		J
OBS-1	07/20/2000	Sand	8260	Toluene	1.1	ug/l	J	
OBS-1	07/20/2000	Sand	8270	1,2-Dichlorobenzene	5.2	ug/l	J	
OBS-1	07/20/2000	Sand	8270	1,4-Dichlorobenzene	7.2	ug/l	J	
OBS-1	07/20/2000	Sand	8270	2-Methyl naphthalene	0.39	ug/l	J	
OBS-1	07/20/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	11	ug/l	B	J
OBS-1	07/20/2000	Sand	8270	Dibenzofuran	0.39	ug/l	J	
OBS-1	07/20/2000	Sand	8270	Naphthalene	0.64	ug/l	J	
OBS-1	07/20/2000	Sand	8270	p-chloroaniline	16	ug/l	J	
OBS-1	07/20/2000	Sand	8270	Phenanthrene	0.76	ug/l	J	
OBS-1 DUP	07/20/2000	Sand	8260	Acetone	50	ug/l		
OBS-1 DUP	07/20/2000	Sand	8260	Benzene	4.8	ug/l	J	
OBS-1 DUP	07/20/2000	Sand	8260	Chlorobenzene	1000	ug/l	D	
OBS-1 DUP	07/20/2000	Sand	8260	Tetrachloroethene	4.4	ug/l	J	J
OBS-1 DUP	07/20/2000	Sand	8260	Toluene	1	ug/l	J	
OBS-1F	07/20/2000	Sand	6010	Barium	0.29	mg/l		
OBS-1F	07/20/2000	Sand	6010	Copper	0.0038	mg/l	B	
OBS-1F	07/20/2000	Sand	6010	Nickel	0.013	mg/l	B	
OBW-1	06-07-2000	Bedrock	6010	Barium	0.069	mg/l		
OBW-1	06-07-2000	Bedrock	6010	Chromium	0.014	mg/l		
OBW-1	06-07-2000	Bedrock	6010	Copper	0.0026	mg/l	B	
OBW-1	06-07-2000	Bedrock	6010	Vanadium	0.0063	mg/l	B	
OBW-1 (aqueous)	06-07-2000	Bedrock	6010	Arsenic	0.0048	mg/l	B	
OBW-1 (aqueous)	06-07-2000	Bedrock	6010	Barium	0.11	mg/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	6010	Chromium	0.015	mg/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	6010	Copper	0.0088	mg/l	B	
OBW-1 (aqueous)	06-07-2000	Bedrock	6010	Lead	0.0075	mg/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	6010	Vanadium	0.009	mg/l	B	
OBW-1 (aqueous)	06-07-2000	Bedrock	6010	Zinc	0.093	mg/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	8260	Chlorobenzene	4400	ug/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	8260	cis/trans-1,2-Dichloroethene	2500	ug/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	8260	Tetrachloroethene	92000	ug/l	D	
OBW-1 (aqueous)	06-07-2000	Bedrock	8260	Toluene	190	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8260	Trichloroethene	1500	ug/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	8260	Vinyl chloride	140	ug/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	1,2,4-Trichlorobenzene	2.1	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	1,2-Dichlorobenzene	74	ug/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	1,4-Dichlorobenzene	6.2	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	2,4,6-Trichlorophenol	1.4	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	2,4-Dichlorophenol	5.7	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	2,4-Dimethylphenol	5.5	ug/l	J	

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	2-Chlorophenol	4.2	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Bis(2-ethylhexyl)phthalate	61	ug/l	B	J
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Butylbenzylphthalate	0.47	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Di-n-butylphthalate	1.2	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Diethylphthalate	0.6	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Fluoranthene	0.42	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Fluorene	0.44	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Naphthalene	3.8	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Nitrobenzene	2100	ug/l	D	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	p-chloroaniline	320	ug/l		
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Phenanthrene	1.2	ug/l	J	
OBW-1 (aqueous)	06-07-2000	Bedrock	8270	Phenol	250	ug/l		
OBW-2	07/07/2000	Bedrock	8260	Benzene	67	ug/l		
OBW-2	07/07/2000	Bedrock	8260	Chlorobenzene	15000	ug/l	D	
OBW-2	07/07/2000	Bedrock	8260	cis/trans-1,2-Dichloroethene	3700	ug/l		
OBW-2	07/07/2000	Bedrock	8260	Tetrachloroethene	120000	ug/l	D	
OBW-2	07/07/2000	Bedrock	8260	Toluene	1400	ug/l		
OBW-2	07/07/2000	Bedrock	8260	Trichloroethene	4100	ug/l	D	J
OBW-2	07/07/2000	Bedrock	8260	Vinyl chloride	45	ug/l		
OBW-2	07/07/2000	Bedrock	8270	1,2,4-Trichlorobenzene	5	ug/l	J	
OBW-2	07/07/2000	Bedrock	8270	1,2-Dichlorobenzene	97	ug/l		
OBW-2	07/07/2000	Bedrock	8270	1,4-Dichlorobenzene	11	ug/l		
OBW-2	07/07/2000	Bedrock	8270	2,4-Dichlorophenol	19	ug/l		
OBW-2	07/07/2000	Bedrock	8270	2,4-Dimethylphenol	3.4	ug/l	J	
OBW-2	07/07/2000	Bedrock	8270	2-Chlorophenol	13	ug/l		
OBW-2	07/07/2000	Bedrock	8270	Bis(2-ethylhexyl)phthalate	31	ug/l	B	J
OBW-2	07/07/2000	Bedrock	8270	Butylbenzylphthalate	0.97	ug/l	J	
OBW-2	07/07/2000	Bedrock	8270	Di-n-butylphthalate	1.4	ug/l	J	
OBW-2	07/07/2000	Bedrock	8270	Diethylphthalate	2	ug/l	J	
OBW-2	07/07/2000	Bedrock	8270	Fluorene	0.5	ug/l	J	
OBW-2	07/07/2000	Bedrock	8270	Naphthalene	3.4	ug/l	J	
OBW-2	07/07/2000	Bedrock	8270	Nitrobenzene	2.4	ug/l	J	
OBW-2	07/07/2000	Bedrock	8270	p-chloroaniline	300	ug/l		
OBW-2	07/07/2000	Bedrock	8270	Phenol	48	ug/l		
OBW-3	07/06/2000	Bedrock	8260	Acetone	87	ug/l	J	
OBW-3	07/06/2000	Bedrock	8260	Benzene	67	ug/l		
OBW-3	07/06/2000	Bedrock	8260	Chlorobenzene	2900	ug/l	D	J
OBW-3	07/06/2000	Bedrock	8260	cis/trans-1,2-Dichloroethene	21	ug/l	J	
OBW-3	07/06/2000	Bedrock	8260	Toluene	5.2	ug/l	J	
OBW-3	07/06/2000	Bedrock	8260	Trichloroethene	39	ug/l		
Piezometer-1	06/27/2000	Silts & Clays	8260	Benzene	0.86	ug/l	J	
Piezometer-1	06/27/2000	Silts & Clays	8260	Chlorobenzene	180	ug/l		
Piezometer-1	06/27/2000	Silts & Clays	8260	Toluene	6.1	ug/l	J	
PZ-FF2	6/20/00	Silts & Clays	8260	Benzene	140	ug/l	J	
PZ-FF2	6/20/00	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	810	ug/l	J	
PZ-FF2	6/20/00	Silts & Clays	8260	Toluene	200000	ug/l	D	J
PZ-FF2	6/20/00	Silts & Clays	8260	Vinyl chloride	740	ug/l		
PZ-FF3	6/22/00	Silts & Clays	8260	Benzene	350	ug/l	J	
PZ-FF3	6/22/00	Silts & Clays	8260	Chlorobenzene	960	ug/l	J	
PZ-FF3	6/22/00	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	1500	ug/l	J	
PZ-FF3	6/22/00	Silts & Clays	8260	Toluene	5700000	ug/l	D	
PZ-FF3	6/22/00	Silts & Clays	8260	Trichloroethene	1500	ug/l	J	
PZ-FF3	6/22/00	Silts & Clays	8260	Vinyl chloride	1100	ug/l		
QS-1	07/13/2000	Silts & Clays	6010	Arsenic	0.0034	mg/l	B	
QS-1	07/13/2000	Silts & Clays	6010	Barium	2.6	mg/l		
QS-1	07/13/2000	Silts & Clays	6010	Copper	0.0076	mg/l	B	
QS-1	07/13/2000	Silts & Clays	6010	Lead	0.01	mg/l		
QS-1	07/13/2000	Silts & Clays	6010	Zinc	0.028	mg/l	N	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
QS-1	07/13/2000	Silts & Clays	8141	Alachlor	1.6	ug/l		
QS-1	07/13/2000	Silts & Clays	8260	Chlorobenzene	1.3	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8260	Tetrachloroethene	3.9	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8270	Benzo(a)anthracene	0.51	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	8.9	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8270	Butylbenzylphthalate	0.97	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8270	Di-n-butylphthalate	2.8	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8270	Di-n-octylphthalate	1.1	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8270	Fluoranthene	1.1	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8270	Phenanthrene	0.66	ug/l	J	
QS-1	07/13/2000	Silts & Clays	8270	Pyrene	1.4	ug/l	J	
QS-1F	07/13/2000	Silts & Clays	6010	Barium	2.4	mg/l		
QS-1F	07/13/2000	Silts & Clays	6010	Copper	0.0048	mg/l	B	J
QS-1F	07/13/2000	Silts & Clays	6010	Zinc	0.0077	mg/l	B	
REC-1	07/11/2000	Silts & Clays	8260	Chlorobenzene	16000	ug/l		
REC-1	07/11/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	1300	ug/l		
REC-1	07/11/2000	Silts & Clays	8260	Methylene chloride	980	ug/l	JB	J
REC-1	07/11/2000	Silts & Clays	8260	Tetrachloroethene	57000	ug/l		
REC-1	07/11/2000	Silts & Clays	8260	Trichloroethene	1000	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	1,2,4-Trichlorobenzene	5.1	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	1,2-Dichlorobenzene	160	ug/l		
REC-1	07/11/2000	Silts & Clays	8270	1,4-Dichlorobenzene	13	ug/l		
REC-1	07/11/2000	Silts & Clays	8270	2,4,6-Trichlorophenol	1.1	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	2,4-Dichlorophenol	1.5	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	2,4-Dimethylphenol	1	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	2-Chlorophenol	0.58	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Acenaphthene	0.35	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Benzo(a)anthracene	1	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Benzo(a)pyrene	0.83	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Benzo(b)fluoranthene	0.76	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Benzo(g,h,i)perylene	0.84	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Benzo(k)fluoranthene	0.86	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	16	ug/l		
REC-1	07/11/2000	Silts & Clays	8270	Butylbenzylphthalate	5.1	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Chrysene	1.3	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Di-n-butylphthalate	22	ug/l		
REC-1	07/11/2000	Silts & Clays	8270	Di-n-octylphthalate	2.1	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Diethylphthalate	1.4	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Fluoranthene	1.2	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	0.85	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Naphthalene	0.9	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Nitrobenzene	1.2	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	p-chloroaniline	32	ug/l		
REC-1	07/11/2000	Silts & Clays	8270	Phenanthrene	2.1	ug/l	J	
REC-1	07/11/2000	Silts & Clays	8270	Phenol	28	ug/l		
REC-1	07/11/2000	Silts & Clays	8270	Pyrene	0.9	ug/l	J	
REC-2	06/28/2000	Silts & Clays	8260	Chlorobenzene	1200	ug/l	J	
REC-2	06/28/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	1500	ug/l		
REC-2	06/28/2000	Silts & Clays	8260	Methylene chloride	640	ug/l	JB	J
REC-2	06/28/2000	Silts & Clays	8260	Tetrachloroethene	59000	ug/l		
REC-2	06/28/2000	Silts & Clays	8260	Trichloroethene	1400	ug/l	J	
REC-2	06/28/2000	Silts & Clays	8270	1,2,4-Trichlorobenzene	1.6	ug/l	J	
REC-2	06/28/2000	Silts & Clays	8270	1,2-Dichlorobenzene	47	ug/l		
REC-2	06/28/2000	Silts & Clays	8270	1,4-Dichlorobenzene	5.7	ug/l	J	
REC-2	06/28/2000	Silts & Clays	8270	2-Chlorophenol	0.67	ug/l	J	
REC-2	06/28/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	37	ug/l	B	J
REC-2	06/28/2000	Silts & Clays	8270	Di-n-butylphthalate	0.76	ug/l	J	
REC-2	06/28/2000	Silts & Clays	8270	p-chloroaniline	24	ug/l		

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
REC-2	06/28/2000	Silts & Clays	8270	Phenanthrene	0.72	ug/l	J	
REC-3	06/28/2000	Silts & Clays	8260	Chlorobenzene	1100	ug/l		
REC-3	06/28/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	3400	ug/l		
REC-3	06/28/2000	Silts & Clays	8260	Methylene chloride	230	ug/l	JB	J
REC-3	06/28/2000	Silts & Clays	8260	Tetrachloroethene	28000	ug/l		
REC-3	06/28/2000	Silts & Clays	8260	Trichloroethene	3400	ug/l		
REC-3	06/28/2000	Silts & Clays	8260	Vinyl chloride	130	ug/l		
REC-3	06/28/2000	Silts & Clays	8270	1,2,4-Trichlorobenzene	0.76	ug/l	J	
REC-3	06/28/2000	Silts & Clays	8270	1,2-Dichlorobenzene	31	ug/l		
REC-3	06/28/2000	Silts & Clays	8270	1,4-Dichlorobenzene	2.4	ug/l	J	
REC-3	06/28/2000	Silts & Clays	8270	2-Chlorophenol	5	ug/l	J	
REC-3	06/28/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	90	ug/l	B	J
REC-3	06/28/2000	Silts & Clays	8270	Di-n-butylphthalate	0.88	ug/l	J	
REC-3	06/28/2000	Silts & Clays	8270	Fluoranthene	0.38	ug/l	J	
REC-3	06/28/2000	Silts & Clays	8270	p-chloroaniline	35	ug/l		
REC-3	06/28/2000	Silts & Clays	8270	Phenanthrene	0.81	ug/l	J	
REC-4	06/28/2000	Silts & Clays	8260	Chlorobenzene	200	ug/l	J	
REC-4	06/28/2000	Silts & Clays	8260	cis/trans-1,2-Dichloroethene	260	ug/l		
REC-4	06/28/2000	Silts & Clays	8260	Tetrachloroethene	9400	ug/l		
REC-4	06/28/2000	Silts & Clays	8260	Trichloroethene	1100	ug/l		
REC-4	06/28/2000	Silts & Clays	8260	Vinyl chloride	26	ug/l		
REC-4	06/28/2000	Silts & Clays	8270	1,2-Dichlorobenzene	3.3	ug/l	J	
REC-4	06/28/2000	Silts & Clays	8270	1,4-Dichlorobenzene	1	ug/l	J	
REC-4	06/28/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	13	ug/l	B	J
REC-4	06/28/2000	Silts & Clays	8270	Butylbenzylphthalate	0.71	ug/l	J	
REC-4	06/28/2000	Silts & Clays	8270	Di-n-butylphthalate	0.89	ug/l	J	
REC-4	06/28/2000	Silts & Clays	8270	p-chloroaniline	120	ug/l		
REC-4	06/28/2000	Silts & Clays	8270	Phenanthrene	0.74	ug/l	J	
TW-1	07/18/2000	Sand	6010	Barium	0.34	mg/l		
TW-1	07/18/2000	Sand	6010	Copper	0.006	mg/l	B	
TW-1	07/18/2000	Sand	6010	Nickel	0.0073	mg/l	B	
TW-1	07/19/2000	Sand	8260	Acetone	30	ug/l	J	
TW-1	07/19/2000	Sand	8260	Chlorobenzene	130	ug/l	B	J
TW-1	07/19/2000	Sand	8260	Tetrachloroethene	3.3	ug/l	J	J
TW-1	07/19/2000	Sand	8260	Toluene	0.51	ug/l	J	
TW-1	07/18/2000	Sand	8270	1,2-Dichlorobenzene	2	ug/l	J	
TW-1	07/18/2000	Sand	8270	1,4-Dichlorobenzene	3.3	ug/l	J	
TW-1	07/18/2000	Sand	8270	Benzo(a)anthracene	0.58	ug/l	J	
TW-1	07/18/2000	Sand	8270	Benzo(a)pyrene	1.2	ug/l	J	
TW-1	07/18/2000	Sand	8270	Benzo(b)fluoranthene	0.77	ug/l	J	
TW-1	07/18/2000	Sand	8270	Benzo(g,h,i)perylene	2.2	ug/l	J	
TW-1	07/18/2000	Sand	8270	Benzo(k)fluoranthene	0.94	ug/l	J	
TW-1	07/18/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	2	ug/l	J	
TW-1	07/18/2000	Sand	8270	Di-n-butylphthalate	0.8	ug/l	J	
TW-1	07/18/2000	Sand	8270	Di-n-octylphthalate	0.6	ug/l	J	
TW-1	07/18/2000	Sand	8270	Dibenzo(a,h)anthracene	2.1	ug/l	J	
TW-1	07/18/2000	Sand	8270	Diethylphthalate	4.1	ug/l	J	
TW-1	07/18/2000	Sand	8270	Indeno-(1,2,3-cd)pyrene	1.8	ug/l	J	
TW-1	07/18/2000	Sand	8270	Naphthalene	1.5	ug/l	J	
TW-1F	07/18/2000	Sand	6010	Barium	0.31	mg/l		
TW-1F	07/18/2000	Sand	6010	Nickel	0.0064	mg/l	B	
VW-1	07/26/2000	Silts & Clays	6010	Arsenic	0.015	mg/l		
VW-1	07/26/2000	Silts & Clays	6010	Barium	0.83	mg/l		
VW-1	07/26/2000	Silts & Clays	6010	Beryllium	0.0012	mg/l	B	
VW-1	07/26/2000	Silts & Clays	6010	Cadmium	0.0029	mg/l	B	
VW-1	07/26/2000	Silts & Clays	6010	Chromium	0.04	mg/l		
VW-1	07/26/2000	Silts & Clays	6010	Cobalt	0.014	mg/l		
VW-1	07/26/2000	Silts & Clays	6010	Copper	0.071	mg/l		

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
VW-1	07/26/2000	Silts & Clays	6010	Lead	0.37	mg/l		J
VW-1	07/26/2000	Silts & Clays	6010	Nickel	0.028	mg/l	B	
VW-1	07/26/2000	Silts & Clays	6010	Tin	0.07	mg/l		
VW-1	07/26/2000	Silts & Clays	6010	Vanadium	0.038	mg/l		
VW-1	07/26/2000	Silts & Clays	6010	Zinc	0.41	mg/l		J
VW-1	07/26/2000	Silts & Clays	8260	Benzene	15000	ug/l	D	
VW-1	07/26/2000	Silts & Clays	8260	Chlorobenzene	4800	ug/l	D	
VW-1	07/26/2000	Silts & Clays	8260	Chloromethane	6.8	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8260	Ethylbenzene	8	ug/l		
VW-1	07/26/2000	Silts & Clays	8260	Toluene	5.4	ug/l		
VW-1	07/26/2000	Silts & Clays	8260	Xylene	24	ug/l		
VW-1	07/26/2000	Silts & Clays	8270	2-Chlorophenol	9.9	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	2-Methyl naphthalene	4	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Acenaphthene	3	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Anthracene	1.1	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Benzo(a)anthracene	1.8	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Benzo(a)pyrene	1.2	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Benzo(b)fluoranthene	1.5	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Benzo(k)fluoranthene	1.8	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	4.5	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Butylbenzylphthalate	1.2	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Chrysene	2.1	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Di-n-octylphthalate	0.94	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Dibenzofuran	1.1	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Fluoranthene	4.2	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Fluorene	3.1	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	0.83	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Naphthalene	53	ug/l		
VW-1	07/26/2000	Silts & Clays	8270	p-chloroaniline	51	ug/l		J
VW-1	07/26/2000	Silts & Clays	8270	Phenanthrene	4	ug/l	J	
VW-1	07/26/2000	Silts & Clays	8270	Phenol	110	ug/l		
VW-1	07/26/2000	Silts & Clays	8270	Pyrene	3.9	ug/l	J	
VW-1	07/26/2000	Silts & Clays	SW7470	Mercury	0.00037	mg/l		
VW-1F	07/26/2000	Silts & Clays	6010	Arsenic	0.0059	mg/l	B	
VW-1F	07/26/2000	Silts & Clays	6010	Barium	0.29	mg/l		
VW-1 Dup	07/26/2000	Silts & Clays	6010	Arsenic	0.0044	mg/l	B	
VW-1 Dup	07/26/2000	Silts & Clays	6010	Barium	0.51	mg/l		
VW-1 Dup	07/26/2000	Silts & Clays	6010	Chromium	0.0067	mg/l	B	
VW-1 Dup	07/26/2000	Silts & Clays	6010	Cobalt	0.0024	mg/l	B	
VW-1 Dup	07/26/2000	Silts & Clays	6010	Copper	0.019	mg/l	B	
VW-1 Dup	07/26/2000	Silts & Clays	6010	Lead	0.066	mg/l		J
VW-1 Dup	07/26/2000	Silts & Clays	6010	Nickel	0.0049	mg/l	B	
VW-1 Dup	07/26/2000	Silts & Clays	6010	Vanadium	0.0079	mg/l	B	
VW-1 Dup	07/26/2000	Silts & Clays	6010	Zinc	0.077	mg/l		J
VW-1 Dup	07/26/2000	Silts & Clays	8260	Benzene	15000	ug/l	D	
VW-1 Dup	07/26/2000	Silts & Clays	8260	Chlorobenzene	4500	ug/l	D	
VW-1 Dup	07/26/2000	Silts & Clays	8260	Chloromethane	5.5	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8260	Ethylbenzene	6.4	ug/l		
VW-1 Dup	07/26/2000	Silts & Clays	8260	Toluene	4.3	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8260	Xylene	19	ug/l		
VW-1 Dup	07/26/2000	Silts & Clays	8270	2-Chlorophenol	10	ug/l		
VW-1 Dup	07/26/2000	Silts & Clays	8270	2-Methyl naphthalene	3.8	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Acenaphthene	2.7	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Anthracene	1.1	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Benzo(a)anthracene	1.4	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Benzo(a)pyrene	1.1	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Benzo(b)fluoranthene	0.98	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Benzo(k)fluoranthene	1.4	ug/l	J	

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
VW-1 Dup	07/26/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	3.9	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Butylbenzylphthalate	0.6	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Chrysene	1.6	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Dibenzofuran	1.1	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Fluoranthene	3.8	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Fluorene	3.2	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	0.64	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Naphthalene	47	ug/l		
VW-1 Dup	07/26/2000	Silts & Clays	8270	p-chloroaniline	47	ug/l		J
VW-1 Dup	07/26/2000	Silts & Clays	8270	Phenanthrene	3.7	ug/l	J	
VW-1 Dup	07/26/2000	Silts & Clays	8270	Phenol	120	ug/l		
VW-1 Dup	07/26/2000	Silts & Clays	8270	Pyrene	3.7	ug/l	J	
VW-1 DupF	07/26/2000	Silts & Clays	6010	Barium	0.28	mg/l		
VW-1 DupF	07/26/2000	Silts & Clays	6010	Copper	0.00091	mg/l	B	
VW-2	08/01/2000	Silts & Clays	6010	Antimony	0.057	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Arsenic	0.031	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Barium	2.7	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Beryllium	0.0018	mg/l	B	
VW-2	08/01/2000	Silts & Clays	6010	Cadmium	0.0048	mg/l	B	
VW-2	08/01/2000	Silts & Clays	6010	Chromium	0.049	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Cobalt	0.032	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Copper	0.25	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Lead	0.78	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Nickel	0.13	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Tin	0.062	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Vanadium	0.064	mg/l		
VW-2	08/01/2000	Silts & Clays	6010	Zinc	1	mg/l		
VW-2	08/01/2000	Silts & Clays	8260	Benzene	35	ug/l		J
VW-2	08/01/2000	Silts & Clays	8260	Chlorobenzene	970	ug/l	D	
VW-2	08/01/2000	Silts & Clays	8260	Toluene	1.9	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8260	Trichloroethene	0.7	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	2-Chlorophenol	1.7	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	2-Methyl naphthalene	0.49	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Acenaphthene	0.72	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Benzo(a)anthracene	2.8	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Benzo(a)pyrene	2.7	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Benzo(b)fluoranthene	2.6	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Benzo(g,h,i)perylene	2.4	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Benzo(k)fluoranthene	3.2	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Bis(2-ethylhexyl)phthalate	14	ug/l		
VW-2	08/01/2000	Silts & Clays	8270	Chrysene	3.2	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Di-n-octylphthalate	0.74	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Dibenzo(a,h)anthracene	0.97	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Diethylphthalate	0.69	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Fluoranthene	6.1	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Indeno-(1,2,3-cd)pyrene	2.1	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Naphthalene	0.71	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	p-chloroaniline	2.1	ug/l	J	
VW-2	08/01/2000	Silts & Clays	8270	Pyrene	6.3	ug/l	J	
VW-2	08/01/2000	Silts & Clays	SW7470	Mercury	0.00059	mg/l		
VW-2F	08/01/2000	Silts & Clays	6010	Arsenic	0.0055	mg/l	B	
VW-2F	08/01/2000	Silts & Clays	6010	Barium	1.4	mg/l		
VW-2F	08/01/2000	Silts & Clays	6010	Cobalt	0.0019	mg/l	B	
VW-2F	08/01/2000	Silts & Clays	6010	Copper	0.012	mg/l	B	
VW-2F	08/01/2000	Silts & Clays	6010	Lead	0.094	mg/l		
VW-2F	08/01/2000	Silts & Clays	6010	Nickel	0.0094	mg/l	B	
VW-2F	08/01/2000	Silts & Clays	6010	Vanadium	0.011	mg/l		
VW-2F	08/01/2000	Silts & Clays	6010	Zinc	0.11	mg/l		

SUMMARY OF GROUNDWATER DETECTIONS

Sample ID	Sample Date	Well Depth	Method	Compound	Result	Units	Lab Q	URS Q
VW-2B	07/25/2000	Sand	6010	Arsenic	0.024	mg/l		
VW-2B	07/25/2000	Sand	6010	Barium	0.08	mg/l		
VW-2B	07/25/2000	Sand	6010	Cadmium	0.00073	mg/l	B	
VW-2B	07/25/2000	Sand	6010	Cobalt	0.0029	mg/l	B	
VW-2B	07/25/2000	Sand	6010	Copper	0.01	mg/l	B	
VW-2B	07/25/2000	Sand	6010	Lead	0.0041	mg/l	B	
VW-2B	07/25/2000	Sand	6010	Nickel	0.0066	mg/l	B	
VW-2B	07/25/2000	Sand	6010	Zinc	0.089	mg/l		
VW-2B	07/25/2000	Sand	8260	cis/trans-1,2-Dichloroethene	230	ug/l		
VW-2B	07/25/2000	Sand	8260	Vinyl chloride	21	ug/l		
VW-2B	07/25/2000	Sand	8270	Bis(2-ethylhexyl)phthalate	26	ug/l	B	J
VW-2B	07/25/2000	Sand	8270	Butylbenzylphthalate	1.9	ug/l	J	
VW-2B	07/25/2000	Sand	8270	Di-n-butylphthalate	1.2	ug/l	J	
VW-2B	07/25/2000	Sand	8270	Di-n-octylphthalate	2	ug/l	J	
VW-2B	07/25/2000	Sand	8270	Dibenzo(a,h)anthracene	2.4	ug/l	J	
VW-2B	07/25/2000	Sand	8270	Diethylphthalate	1.3	ug/l	J	
VW-2B	07/25/2000	Sand	8270	Fluoranthene	0.51	ug/l	J	
VW-2B	07/25/2000	Sand	8270	Phenanthrene	0.38	ug/l	J	
VW-2B	07/25/2000	Sand	8270	Pyrene	0.7	ug/l	J	
VW-2BF	07/25/2000	Sand	6010	Barium	0.044	mg/l		
VW-2BF	07/25/2000	Sand	6010	Cobalt	0.0024	mg/l	B	
VW-2BF	07/25/2000	Sand	6010	Copper	0.0038	mg/l	B	
VW-2BF	07/25/2000	Sand	6010	Zinc	0.036	mg/l		